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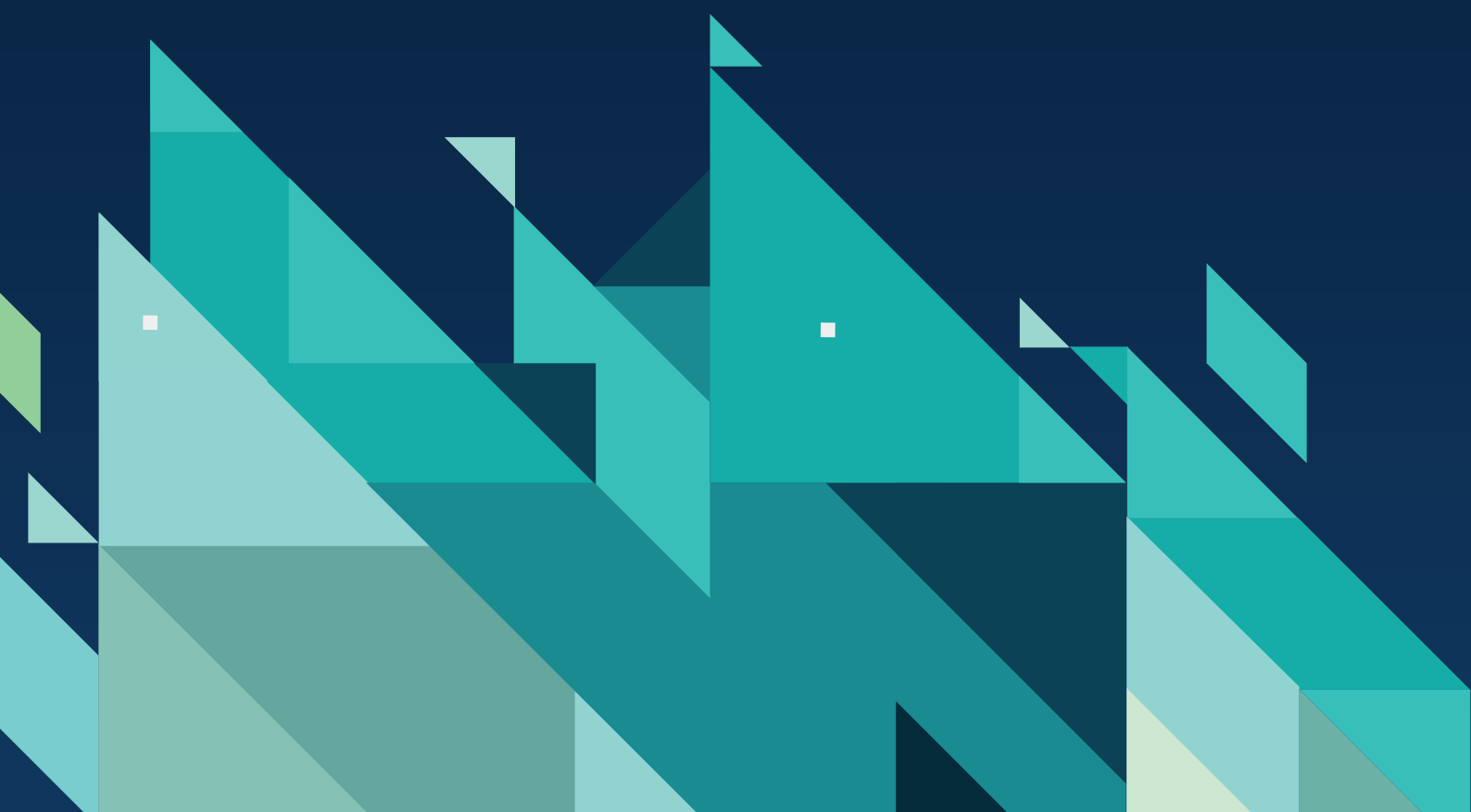
Number 236, October 2026



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Child poverty and educational outcomes in Ireland

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October 2026

ESRI Research Series Paper

Number 236

Available to download from www.esri.ie
<https://doi.org/10.26504/rs236>

2026 The Economic and Social Research Institute
Whitaker Square, Sir John Rogerson's Quay, Dublin 2.



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Acknowledgements

This publication was funded by the Department of Children, Disability and Equality (DCDE) through a joint research partnership with the ESRI. The views, opinions, findings, conclusions and/or recommendations expressed here are strictly those of the authors. They do not necessarily reflect the views of the DCDE, which takes no responsibility for any errors or omissions in, or for the accuracy of, the information contained in this publication. It is presented to inform and stimulate wider debate among the policy community and among academics and practitioners in the field.

We are grateful to members of the programme steering group (Ciara Pidgeon, Nuala Connolly, Aisling Murray and Morag Henderson) for their support and constructive comments on the report. We are also grateful to the editor of the Research Series (Anne Nolan), an external reviewer and two internal reviewers for the comments provided. This work would not be possible without the contribution of the former Growing Up in Ireland (GUI) team, the young people and their families.

GUI is the national longitudinal study of children and young people, funded by the Government of Ireland. GUI is managed as a partnership between the DCDE and the Central Statistics Office (CSO). The CSO is responsible for the survey element of GUI. Results in this report are based on analyses of data from Research Microdata Files provided by the CSO and of Anonymised Microdata Files provided by the Irish Social Science Data Archive (ISSDA). Neither the CSO nor the DCDE takes any responsibility for the views expressed in this report or the outputs generated from these analyses.

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Abbreviations

CSO	Central Statistics Office
DCDE	Department of Children, Disability and Equality
DEY	Department of Education and Youth
ESRI	Economic and Social Research Institute
GUI	Growing Up in Ireland
GSEM	General structural equation model
HLE	Home learning environment
ISSDA	Irish Social Science Data Archive
OECD	Organisation for Economic Co-operation and Development
OLS	Ordinary least squares
PCG	Primary caregiver
PRSI	Pay-related social insurance
TCD	Trinity College Dublin

Executive summary

Background to the study

Children and young people in Ireland are more likely than other age groups to live in households experiencing poverty and deprivation (CSO, 2025).¹ Experience of poverty is significantly related to poorer educational outcomes, though to date there has been little comprehensive research, especially in the Irish context, on what factors explain this impact of poverty. This study measures exposure to persistent poverty as the number of survey waves in which children were living in households in the lowest income quintile and/or experiencing difficulties making ends meet. Growing Up in Ireland data for Cohort '08 are used to look at the relationship between exposure to persistent poverty and a range of educational outcomes at ages 9 and 13, covering cognitive development, educational expectations, and attitudes to school and school subjects. The report examines the extent to which these patterns are explained by the impact of poverty on family relationships, the home learning environment, out-of-school activities, and neighbourhood, teacher and school factors.

Persistent poverty and cognitive development

Around half of 9- and 13-year-olds have experienced at least one spell of poverty, with one in five children experiencing three or more spells by age 13. For some, experience of poverty is continuous while others move in and out of poverty over time. Reading test scores at age 9 and verbal fluency test scores at age 13 decline with each additional spell in poverty. Structural equation models were used to explore which set of factors best explained the impact of poverty on test scores. At both ages 9 and 13, the home learning environment plays an important role; in other words, test scores are lower because of the impact of persistent poverty on access to books, reading to the child at age 5, and other activities that help enhance cognitive development. Children living in poverty are less likely to be involved in cultural and sports activities, which plays an important role in mediating the effects on test scores at age 9. Teacher and school factors, especially the quality of teacher–student relationships, become a more significant influence on measures of cognitive development in adolescence.

¹ Household Income Deprivation and Poverty: Children and Young Persons Hub.

Persistent poverty and attitudes to school and school subjects

Attitudes to school vary more markedly by persistent poverty at age 13 than at age 9, with relatively positive attitudes to school across all social groups at primary level. Teacher and school factors play an important role in explaining the effects of poverty, though home learning environment, neighbourhood factors and out-of-school activities all play a part. Those living in persistent poverty are more likely to find their school subjects difficult, with much of this difference explained by the home learning environment. Thirteen-year-olds living in persistent poverty have lower educational expectations than their peers, a pattern that is largely explained by teacher and school factors along with the home learning environment.

Implications for policy development

The study findings identify some of the main policy levers which could help reduce the effects of poverty on educational outcomes. Children in poor families have less access to books and cultural outings, as well as lower levels of engagement in sports and cultural activities such as drama or dance classes, than their peers. The findings point to the importance of schools in providing access to a range of extra-curricular activities and in promoting parent–child reading. However, increased provision of community-based subsidised activities (such as those provided under the Creative Youth programme) is also needed to enhance equity of access. School and teacher factors play an important role, especially for adolescents, highlighting the importance of measures to promote a positive school climate and the use of more inclusive teaching practices. It is also important to promote an understanding of disadvantage and diversity in initial and continuing teacher education. The DEIS² programme provides an important support to children living in disadvantaged areas, but almost two-thirds of those in persistent poverty attend non-DEIS schools. This provides an important evidence base to support the recent DEIS strategy’s commitment to address educational disadvantage across all schools, including those outside DEIS. School-based measures must be located within a broader set of income and other supports for families as well as community development initiatives to counter area-based disadvantage.

² The Delivering Equality of Opportunity in Schools (DEIS) programme provides additional supports and resources to schools serving socio-economically disadvantaged communities.

Chapter 1

Introduction

1.1 Background to the study

A large body of international research documents the relationship between family socioeconomic characteristics – including household income – and child outcomes (see, for example, Cooper and Stewart, 2021). Research in Ireland has shown that cumulative exposure to economic vulnerability is significantly related to poorer educational outcomes, socio-emotional development, health and disability, self-concept, and quality of relationships for children and young people (Maître et al., 2021). Using Cohort '08 data from the Growing Up in Ireland study, this report builds upon this work to look at a broader range of educational outcomes at ages 9 and 13, including children's own perceptions of their schooling, and to identify the processes whereby persistent poverty impacts on children's educational development. This is an important policy issue as there is consistent evidence that children and young people in Ireland are more likely than other age groups to live in households experiencing poverty/low income and material deprivation (CSO, 2025).³

The main research questions addressed in the study are:

- How does experience of persistent poverty, measured in terms of spells of low income and/or economic strain, impact on children's cognitive development, and attitudes to school and to school subjects?
- To what extent is this effect explained by the impact of persistent poverty on family relationships, home learning environment, out-of-school activities, and school, teacher and neighbourhood factors?

The remainder of this chapter places the study in the context of previous international and Irish research and outlines the methodology used.

1.2 Research on educational inequality

A large body of research points to the ways in which family socioeconomic circumstances shape educational outcomes

³ From a European perspective, rates of child poverty in Ireland are around the middle of the distribution (Eurostat, 2025).

2 | Child poverty and educational outcomes

throughout the schooling career (Campos et al., 2025; Symonds et al., 2025). Research has focused on the role of social class, parental education and income, though increasingly a multi-dimensional approach has been adopted, recognising that all dimensions of family background have an independent role in shaping child outcomes (Bukodi and Goldthorpe, 2013; Pensiero and Schoon, 2019; Sullivan et al., 2013). Studies of the relationship between poverty⁴ and child outcomes have distinguished between the impact of timing and cumulative exposure. Some studies have indicated that income poverty experienced in the early years of childhood can be more consequential for educational achievement and adult employment outcomes than income poverty experienced in later childhood (Duncan et al., 2012 in the US; Shay et al., 2025 in Israel). In Ireland, experience of financial strain at age 9 is significantly related to lower Leaving Certificate grades, even taking account of social class and parental education (Smyth and Darmody, 2026). Persistent childhood poverty is found to lead to poorer child cognitive outcomes than transient poverty, supporting the concept of cumulative (dis)advantage (Dickerson and Popli, 2016; Schoon et al., 2012). The effects of low income can accumulate not only over time but also across the different contexts of the child's life, including their home environment, early years education, school and neighbourhood (Dearing et al., 2024). Studies have often relied on comparing families with different income levels at the same point in time, but looking at changes in family circumstances over time comes closer to capturing the causal impact of income. Such research shows a direct impact of an improvement in income levels on children's outcomes, including achievement, especially for those from low-income families (Björklund and Jäntti, 2020; Dahl and Lochner, 2012).

Studies have also examined the potential mechanisms underlying inequality in educational outcomes, focusing on a range of processes, including family relationships, home learning environment, out-of-school activities, and school, teacher and neighbourhood factors.

The 'family stress model' posits that (repeated) exposure to low income and financial strain can negatively affect child outcomes via their effects on family relationships (Conger and Donnellan, 2007;

⁴ Poverty has been measured in many different ways, including on the basis of absolute or relative income levels, and a combination of low income and being deprived of items that are considered the norm in a society (Slevin et al., 2025; Whelan et al., 2019).

Nixon, 2012; Nixon et al., 2019). Thus, more difficult economic circumstances are found to lead to greater conflict between parents. Parents experience increased stress in their role, resulting in the use of a more punitive parenting style and greater parent–child conflict. This stress and conflict shape the child’s behaviour and their socioemotional difficulties, which then negatively affects their school engagement and achievement. However, some commentators have cautioned against adopting a deficit approach that emphasises parenting styles rather than structural factors (see, for example, Hartas, 2014).

Social reproduction theory suggests that families differ in the economic, cultural and social capitals they possess, with middle-class behaviours, preferences and skills (‘habitus’) being rewarded in the educational system (Bourdieu and Passeron, 1979). Middle-class and working-class families are found to differ in their approach to childrearing, with middle-class parents engaging in ‘concerted cultivation’, that is, encouraging children to engage in the kinds of activities that are rewarded within the education system (Lareau, 2011). This leads to differences in the home learning environment, with middle-class families found to engage more in reading with the child and visiting concerts, plays, museums and galleries. These activities, in turn, foster cognitive development and within-school achievement (Breinholt and Jaeger, 2020; Sullivan and Brown, 2013). Further studies suggest that reading with children, rather than Bourdieu’s original notion of highbrow cultural activities, has a stronger positive effect on educational outcomes (De Graaf et al., 2000). This body of research often focuses on the home learning environment but can be extended to encompass out-of-school structured activities, that become more important as children grow older. Participation in a range of different structured out-of-school activities, including organised sports, art or music classes, and school clubs, is found to be associated with higher academic achievement (Broh, 2002; Covay and Carbonaro, 2010; Fredericks and Eccles, 1996). In Ireland, children and young people who read for pleasure and take part in structured cultural classes tend to have better verbal and numeric skills, be more engaged in school and have better academic self-image, that is, more confidence in relation to their schoolwork, taking account of social background and other family and school factors (Smyth, 2016a).

Inequalities in educational outcomes can also stem from school factors. Research in the US, where schools depend on local taxes for

funding, has pointed to poorer resources and facilities as well as higher rates of teacher turnover in schools serving low-income populations (Lee et al., 2022; Ronfeldt et al., 2013). Other studies have pointed to the role of school composition in shaping educational outcomes, with schools with more disadvantaged student populations having lower levels of academic performance, even taking account of individual social background (Langenkamp and Carbonaro, 2018; McCoy et al., 2014; Palardy et al., 2015; Smyth, 1999). This effect is explained by the way in which social class becomes embedded in school climate and day-to-day practices (its institutional habitus), including access to certain subjects and subject levels as well as career guidance (McDonough, 1997). The nature of the parent–school relationship may also differ by social background, with middle-class parents more likely to be formally involved in the school; even informal contact can serve to signal socioeconomic differences in parental interest from the teacher perspective (Barg, 2019; Krane and Klevan, 2018). Furthermore, more advantaged parents are more likely to possess the insider knowledge of what is required for their child to succeed in education (Crozier et al., 2011). Children from middle-class families also themselves learn beneficial strategies to navigate the school context from their parents, such as approaching teachers for help (Calarco, 2014).

School processes, especially the quality of teacher–student relationships, are found to play a significant role in reinforcing or countering inequality. Teacher–student relationships characterised by closeness and little conflict are found to positively affect school engagement, academic self-concept and achievement (Di Lisio et al., 2025; Helm and Huber, 2022). However, significant differences in relationship quality are found by socioeconomic background (Jerome et al., 2009), even at an early age (Smyth et al., 2026). Qualitative research indicates that even primary school children can be aware of the social class differences between them and their teachers in terms of accent and self-presentation (Devine et al., 2024). The school’s approach to discipline can also impact on achievement, with US research pointing to socioeconomic status disparities in the experience of harsh measures, such as exclusion, with marked consequences for educational outcomes (Skiba et al., 2014). In Ireland, schools with a more disadvantaged intake are more likely to use more punitive measures, like temporary exclusion (Smyth and Quail, 2017). Such measures, along with more negative interaction

with teachers, have been shown to lead to greater school disengagement among working-class students (Smyth, 2016b).

There has been a good deal of debate about neighbourhood effects, with difficulties disentangling school and neighbourhood influences in systems where children generally attend their local school (Johnson, 2012). However, there is evidence of an effect of neighbourhood socioeconomic disadvantage on school engagement and cognitive development (Burdick-Will, 2018; Sharkey and Elwert, 2011). Using English longitudinal data, Nieuwenhuis et al. (2021) found the lowest levels of educational attainment among young people living in high-poverty areas and attending high-poverty schools, with more periods of exposure leading to worse outcomes.

While the effect of poverty on educational outcomes can operate through the mechanisms outlined here, poverty can also have a direct effect, with being hungry or tired negatively affecting the child's ability to engage in learning (Fitzpatrick et al., 2015; Holdaway and Becker, 2018). Johnson and Markowitz (2018), in the US, found that food insecurity (families going without meals or reducing food consumption) was significantly related to lower cognitive skills by age 5. Furthermore, lack of money for sports equipment and other school-based activities may hinder engagement in school (Devine et al., 2024; Smyth et al., 2025). Lack of access to resources will also prevent participation in private tuition (shadow education), which is widespread among higher income households in Ireland but predominantly at secondary school level (Benz et al., 2024).

1.3 Data and methodology

1.3.1 Data

The analyses in this report use data from Cohort '08 of the Growing Up in Ireland study, which has followed children and their families from 9 months to 13 years of age. The sample was recruited on the basis of the Child Benefit Register and is nationally representative. At age 9, one-to-one interviews were conducted with the primary caregiver (almost always the mother), the secondary caregiver (when living in the household)⁵ and the child. More sensitive questions were answered on a self-complete basis. The response rate at age 9 was 78 per cent of the valid sample. Fieldwork for the cohort at age 13 took place in

⁵ A postal questionnaire was sent to non-resident parents.

2021/22 in the wake of the Covid-19 pandemic so the mode shifted to phone interview, with the questionnaire length reduced to allow for phone administration (Murray et al., 2023). Sensitive questions were asked in an online survey. The response rate was 80 per cent for the main survey but was much reduced for the online component (41 per cent for the primary caregiver and 32 per cent for the young person). This has implications for some of the measures we can use at age 13. At both timepoints a postal questionnaire was sent to the principal of the school the young person attended; at age 9, information was collected from the child's teacher on their own characteristics and their perceptions of the child. In the analyses, weights were used to adjust for non-response and attrition. These weights adjusted for a range of characteristics, including parental income, education and social class, region, family structure and housing tenure, among others, to make the sample representative of the national population of those living in Ireland at 9 months of age (Murray et al., 2023).⁶ Because of our focus on the persistence of poverty over time and the modelling approach used (see below), analyses included only those families who took part in GUI in every wave of the study⁷ and who did not have missing values on the variables included in the models. This resulted in a sample of 7,476 9-year-olds and 6,031 13-year-olds.

1.3.2 Outcome and explanatory variables

The educational outcomes were selected to reflect both cognitive development and school engagement. At age 9, cognitive development was captured in the GUI survey using a subset of the Drumcondra vocabulary test items (a nationally standardised test designed to be relevant to the Irish curriculum) and a selective attention test. The latter involved searching for small symbols on a map and was used to capture cognitive capacity and executive functioning, independently of accumulated knowledge and language ability (McNamara et al., 2020). At age 13, the constraints posed by remote interviewing meant a written cognitive test could not be administered. Instead, the young people were asked to complete a semantic verbal fluency test which required them to name as many animals as possible in a set time (Murray et al., 2023).

At age 9, school engagement was measured in terms of whether the child liked school 'always', 'sometimes' or 'never'. At age 13, more

⁶ The sample does not, therefore, include families who immigrated after the child was 9 months old.

⁷ The exception is Wave 4, a short postal survey of primary caregivers that had a lower response rate than the main sweeps.

differentiated response categories were used, ranging from ‘like very much’ to ‘don’t like/hate’. Questions on the perceived difficulty of English, Irish, Maths and Science at age 13 were summed into a scale of perceived subject difficulty. In addition, a question on the educational expectations of the young person was recoded to distinguish between those aspiring to a degree (or higher) and all others.

1.3.2.1 Poverty measurement

Our central explanatory variable, exposure to poverty, was measured in terms of the number of waves in which the children were living in households in the lowest income quintile and/or reported having great difficulty in making ends meet (economic strain) (Table 1.1).⁸ Analyses therefore include only those families who took part in GUI in every wave of the study. We include the subjective measure of ‘great difficulty’ for two reasons: firstly, because there is a relatively high number of missing cases on the income variable;⁹ and secondly, because it captures the lived experience of families.

The literature on poverty measurement highlights the multi-dimensional nature of poverty (Bailey and Guio, 2022; Dirksen & Alkire, 2021; Whelan et al., 2014). Previous research using the GUI drew on measures of material deprivation developed to encapsulate the experience of exclusion from participation in the normal way of life in society. The deprivation measures were included alongside low income and financial strain to create a latent measure of economic vulnerability (Maître et al., 2021). However, the material deprivation measures were not collected in Wave 6 and therefore could not be used in the current analysis. The measure of poverty used in this study is therefore likely to yield slightly larger estimates than earlier studies using income, deprivation and financial strain.

⁸ Household income is the total household income from all sources and all household members after deductions for tax and PRSI.

⁹ Missingness on the income variable was 6.5% in Wave 1, 7.2% in Wave 2, 8.1% in Wave 3, 12.6% in Wave 5 and 10.1% in Wave 6.

Table 1.1 Poverty dimensions across survey waves

Survey wave	% experiencing great difficulty making ends meet	% in lowest income quintile
W1 (2008)	4.9	22.8
W2 (2011)	9.3	22.3
W3 (2013)	11.3	21.8
W5 (2017)	4.4	21.0
W6 (2021)	3.0	21.4

Source: GUI Cohort '08, Wave 1 to Wave 6.

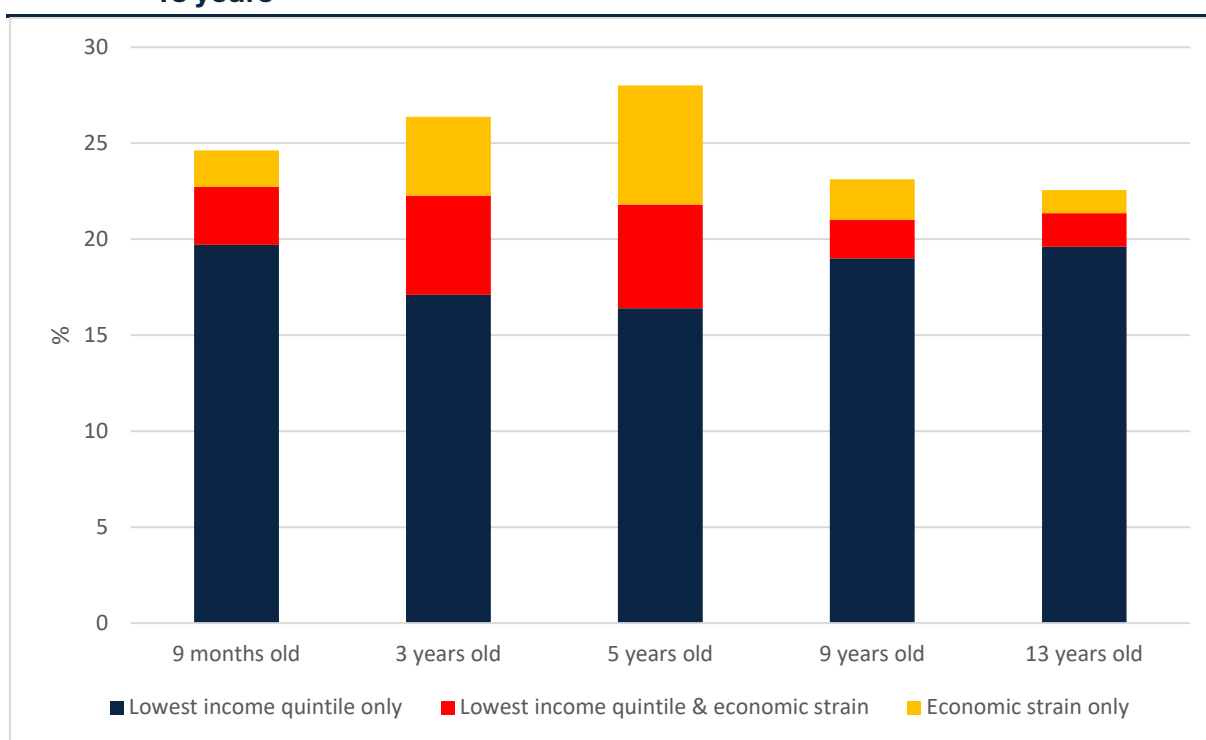
Note: Weighted by panel (longitudinal) weight.

Among families with information on both low income and financial strain, there is a much higher likelihood of recording great difficulty making ends meet for those in the lowest income quintile in each wave (see Table A1 in the appendix). The proportion experiencing 'great difficulty' is at least three times greater for the lowest income quintile in all waves, and five and a half times greater in Waves 1 and 6.¹⁰

Figure 1.1 illustrates the composition of the group defined as 'poor' in each wave. The group in the lowest income quintile only dominates in all waves, given that this measure captures a much larger proportion of the population. As the effects of the financial crash on household resources took hold, the proportion of the group that experienced financial strain increased significantly in Wave 2 (2011) and Wave 3 (2013). The orange bar showing those both in the lowest quintile and experiencing financial stress is also largest in these two years. The proportion of families outside the lowest income quintile experiencing 'great difficulty making ends meet' (yellow bar) also increased substantially in these two years, reflecting the widening experience of financial strain in this period (Whelan et al., 2016). This group also includes households that are missing income data but record financial strain.

¹⁰ The correlation coefficients also show a consistent positive relationship between low income and financial strain across all five waves, but the strength of the association weakened over time as the economy recovered from the recession ($r_1 = 0.2131$, $r_2 = 0.2284$, $r_3 = 0.2029$, $r_4 = 0.1220$, $r_5 = 0.1748$).

Figure 1.1 Percentage of children experiencing poverty between ages 9 months and 13 years



Source: GUI Cohort '08.

Note: Results based on children present in all waves up to age 13.

Using this combined measure of low income and/or experiencing great financial difficulty, we created a measure of poverty persistence that counts the number of survey waves in which the household is poor. Values for 9-year-olds ranged from 0 to 4 and for 13-year-olds from 0 to 5. Descriptive statistics for this and other explanatory variables are presented in Chapter 2.

1.3.2.2 Mediating mechanisms

On the basis of existing research (see Section 1.2), we have identified five sets of potential mechanisms to explore in this study. Table 1.2 outlines the measures used to capture each of these dimensions. Parenting stress was measured at ages 9 and 13 using the six-item 'parental stressors' subscale from Berry and Jones's (1995) Parental Stress Scale (PSS). Items include 'I sometimes worry whether I am doing enough for my child'. While information was collected from both mothers and (resident) fathers, only the mother's parenting stress level is used here in order to retain lone-parent families in the analysis. The eight-item 'conflict' subscale of the Pianta (1992) Parent-Child Relationship Scale was completed by mothers when the children were aged 9 and 13. Items include 'dealing with my child drains my energy'. Mothers were also asked about their approach to disciplining their 9-

year-old child; items relating to more punitive measures (such as shouting or grounding the child) were summed to give a scale of ‘harsh’ parenting style. At age 13, these questions on the parents’ approach to discipline were administered to the young person. At age 9, children were asked how well they got on with their mothers, with this measure recoded into a dichotomy between those who got on ‘very well’ and all others.

The measures of home learning environment (HLE) captured the frequency with which the 9-year-old was read to or parents listened to them read; went on educational visits; went to a concert, play or museum; and visited a library. At age 13, the focus of the questionnaire was more on out-of-school activities so the measures of HLE at age 9 are used in the models along with the mother’s report of how involved she feels she is in her child’s education (recorded at age 13). The questions on out-of-school activities are framed slightly differently in the two waves but include reading for pleasure, and involvement in sports and in cultural activities such as music and dance. Both the out-of-school activities and HLE variables capture the concept of cultural capital discussed above.

The DEIS status of the school is used as a measure of school-level socio-economic disadvantage at both primary and second level (ages 9 and 13). However, it should be noted that this measure captures both the social mix of the school and any potential effects from DEIS supports. At age 9, classroom teachers completed the ‘closeness’ and ‘conflict’ scales of the Pianta Teacher–Child Relationship Scale. Information was not collected from teachers at the age 13 wave due to the difficulty of a single second-level teacher being able to portray the young person’s behaviour in school. At age 9, children were asked the frequency of their teacher praising them, giving out to them and talking to them about things other than school. At age 13, scales of positive interaction (such as being praised) and negative interaction (being given out to for misbehaviour or for schoolwork) were derived. At the neighbourhood level at ages 9 and 13, mothers’ reports of the degree of disorder in the local neighbourhood (such as public drinking or drug-taking) were used to form a scale, while another scale captured local social capital (such as whether neighbours could be relied upon).

Table 1.2 Measures of processes shaping educational outcomes

	Age 9 Processes	Age 13 Processes
Parent–child relationships	• Mother–child conflict* • Mother’s parenting stress* • How well child gets on with mother • Scale of harsh parenting style (mother-reported)*	• Mother–child conflict* • Mother’s parenting stress* • Scale of harsh parenting style (YP-reported)*
Home learning environment	• Books in the home • Reading to the child at age 5 • Listening to the child read • Educational visits with the child • Gone to a concert, play, museum • Visited a library	• Measures from age 9 – includes books in the home, reading to child, listening to child and educational visits • Mother-reported involvement in child’s education
Out-of-school activities	• Time spent reading for pleasure (parent-reported) • Team sports • Individual sports • Drama classes • Arts and crafts • Music/dance	• Frequency of reading for fun (YP-reported) • Team sports • Art, crafts, drama or music • Dance lessons • Drawing/painting
School and teacher factors	• DEIS status • Teacher–child closeness* • Teacher–child conflict* • Child report of positive interaction with teacher • Child report of negative interaction with teacher • Child report of whether teacher talks to them about non-school issues	• DEIS status of primary school • DEIS status of second-level school • Scale of positive interaction with teachers* • Scale of negative interaction with teachers*
Neighbourhood factors	• Urban/rural • Scale of neighbourhood disorder* • Scale of local social capital (trust/safety)*	• Urban/rural • Scale of neighbourhood disorder* • Scale of local social capital (trust/safety)*

Source: GUI Cohort '08 at ages 9 and 13.

Notes: * indicates variables are composed of multiple items.

'YP' = young person.

1.3.3 Methodology

The main aim of the study is to look at the way in which the five mechanisms help to explain differences in educational outcomes by experience of persistent poverty. We therefore used generalised structural equation modelling (the `gsem` function in Stata 18, with direct and indirect effects estimated using the `nlcom` command; StataCorp, 2025).¹¹ This model estimation can be used for continuous or categorical outcomes and can estimate latent variables that are generated from the observed variables specified in the model. Because the set of explanatory variables is very large and differs somewhat between waves (see Table 1.2), each of the five mechanisms is treated as a latent variable underlying each of the indicator variables. Thus, ‘parent–child relationship’ is a latent variable based on mother–child conflict, parenting stress and harsh parenting style. This approach has a number of advantages, allowing us to unpack the extent to which persistent poverty has a direct relationship with, for example, vocabulary test score or an indirect relationship via one of the specified mechanisms. The analyses look at each mechanism separately because structural equation models that included all of the mechanisms did not converge. In order to look at the relative effect of each set of factors, regression models including all of the mechanisms were also estimated. For ease of interpretation, all explanatory and outcome variables have been recoded so that higher values indicate a more positive direction.

Educational outcomes were measured at age 9 and age 13 separately. The models do not include controls for prior measures of cognitive ability or school attitudes because the key research question is the influence of persistent poverty measured from 9 months of age. There is no measure of ability at or prior to 9 months old, and introducing cognitive measures at later interview waves could have meant that these measures would have already been shaped by poverty exposure. Future research, using growth curve techniques, could build on the results of the analysis in this study.

As some of the component measures of latent variables were measured at the same time as the educational outcomes, there is a possibility of reverse causality. For example, liking school (outcome) may lead to more positive relationships with teachers. This issue

¹¹ <http://www.stata.com/manuals/sem.pdf>.

mainly affects the direct relationship between the mediating variables and the outcomes rather than the indirect effect of poverty via the mediating variable, which is our key interest. In the case of reverse causality, we would expect a *weaker indirect effect* via accumulated poverty. Using earlier measures of mediating variables also runs the risk that they are capturing the situation prior to poverty exposure.

All analyses control for gender and child disability (measured at age 9), that is, having a long-term illness or condition that impacts on the child's day-to-day life, at least to some extent.

The analyses do not include other measures of socio-economic background such as social class and parental education; therefore the analysis should be considered as a mapping of the mechanisms underlying the raw association between poverty and educational outcomes. Previous research has shown that poverty risk and poverty persistence among GUI Cohort '08 is strongly influenced by parental education and social class (Maître et al., 2021), and we acknowledge that the dependent variable of poverty persistence also encompasses these effects. Additionally, an assessment of the mechanisms through which parental education or parental social class influence children's educational outcomes would likely include the same set of mediators.

1.4 Outline of the report

In the next chapter we describe the patterns of low income/financial strain experienced by children and their families from 9 months to 13 years old, examining the extent to which this experience persists over time. The chapter also presents the bivariate patterns of association between the level of exposure and a range of educational outcomes, broadly conceived. In Chapter 3, a set of structural equation models is constructed to examine the role of the five sets of explanatory processes in mediating the relationship between poverty duration and educational outcomes. Chapter 4 summarises the findings and draws out implications for policy.

Chapter 2

Persistent poverty and educational outcomes

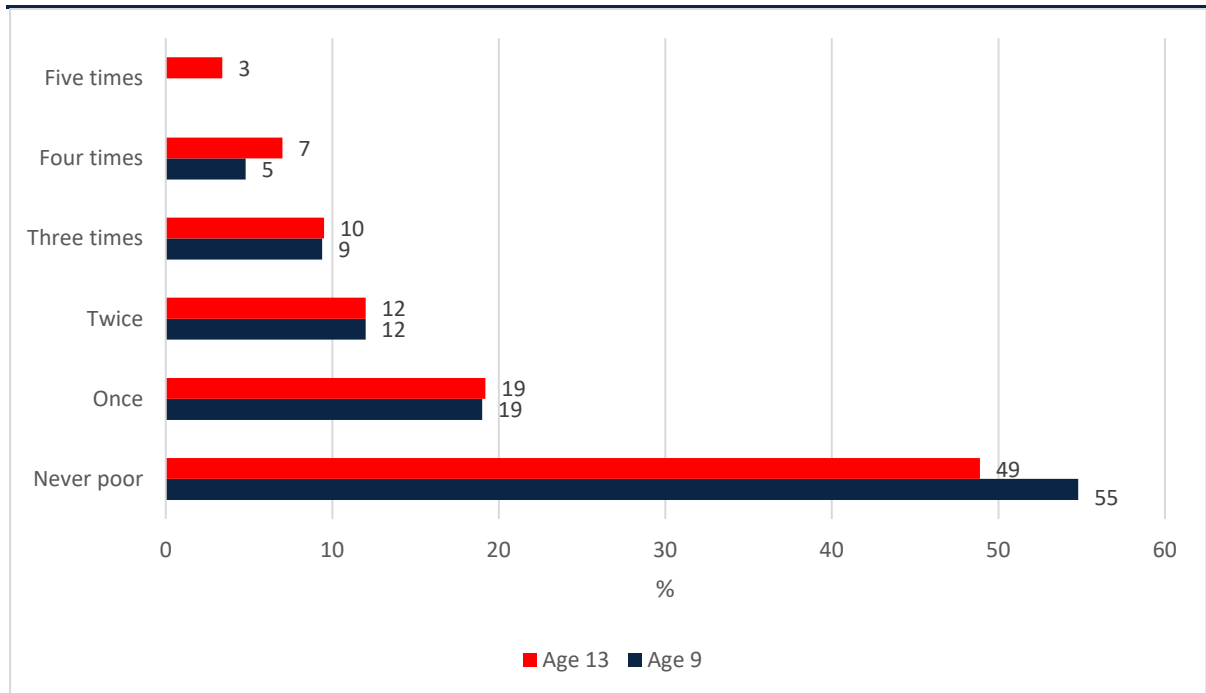
In this chapter we look descriptively at the extent and distribution of poverty persistence and its association with a range of educational outcomes measured at ages 9 and 13. The analysis is descriptive and sets the scene for the analysis of underlying processes in Chapter 3.

2.1 Extent of poverty persistence at ages 9 and 13

Poverty persistence is measured as a simple count of the number of interview waves at which the family is in the lowest income quintile and/or experiencing great difficulty making ends meet. The financial strain element is included because of missing information on income for some families. Interviews were carried out when the child was aged 9 months, 3 years, 5 years, 9 years and 13 years. Therefore, the maximum number of periods in poverty is four at age 9 and five at age 13.

By age 9, 55 per cent of the families had never experienced low income/financial strain, 19 per cent had experienced it only once, and just under 5 per cent had experienced it in all four waves (see Figure 2.1). At age 13, the proportion never experiencing low income/financial strain falls to under half of the cohort, while the proportion experiencing it in all five waves falls to 3 per cent.

Figure 2.1 Poverty persistence: number of times experiencing low income/financial strain at age 9 and age 13

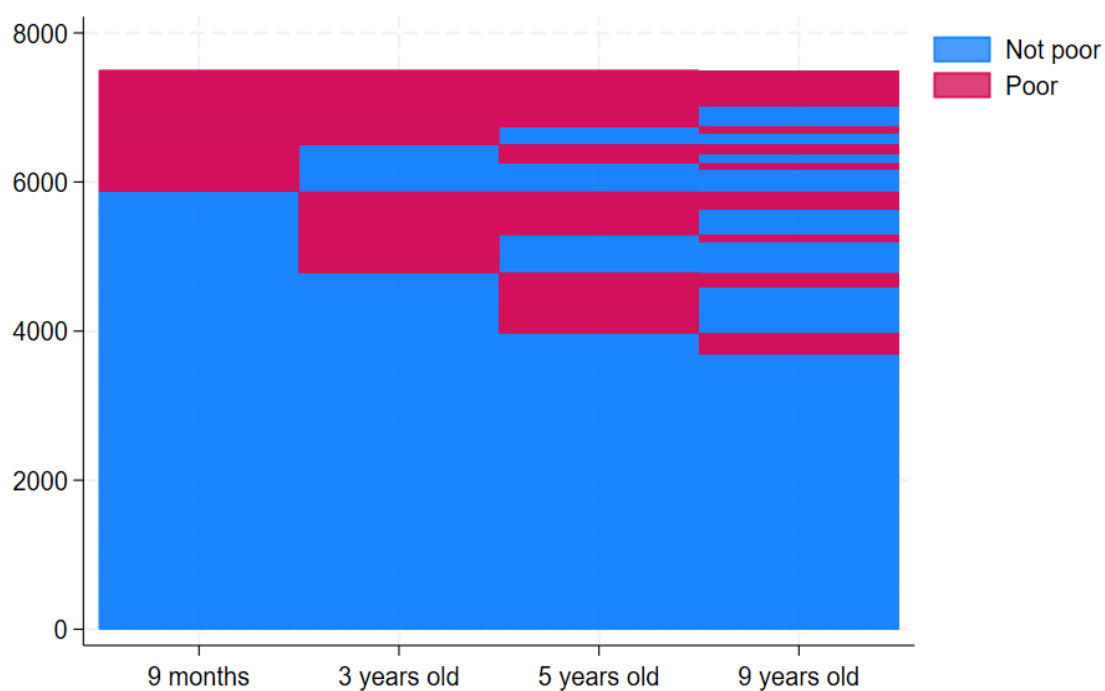


Source: GUI Cohort '08.

The distribution of poverty spells from early to middle childhood (i.e. up to age 9) can also be seen in the following sequence graphs (Figures 2.2 and 2.3). Red cells indicate that the household was experiencing poverty (low income and/or financial stress) at the interview wave in question, while blue cells mean the household was not poor. The most common sequence in the graph is all blue, accounting for over half of the sequences. The next most common sequences experience poverty only at 5 years or 3 years old, and have exited again by the next interview wave. Only a small proportion of households are in poverty throughout (5 per cent).

A similar analysis is undertaken extending the observation window to 13 years old (Figure 2.3). The proportion who are in poverty for all interview waves is smaller than for those observed at 9 years old, and we see that even some of those in poverty from 9 months to 9 years old have exited by age 13.

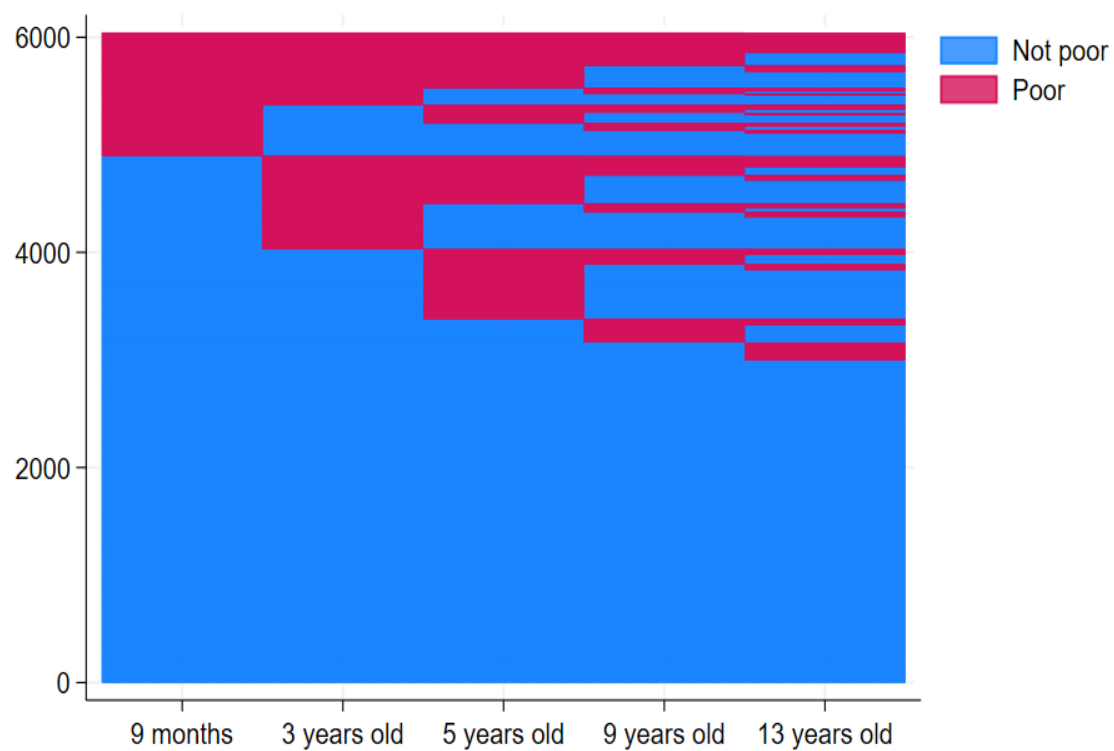
Figure 2.2 Sequence analysis of poverty from age 9 months to 9 years



Source: GUI Cohort '08.

Note: Units relate to number of respondents.

Figure 2.3 Sequence analysis of poverty from age 9 months to 13 years



Source: GUI Cohort '08.

Note: Units relate to number of respondents.

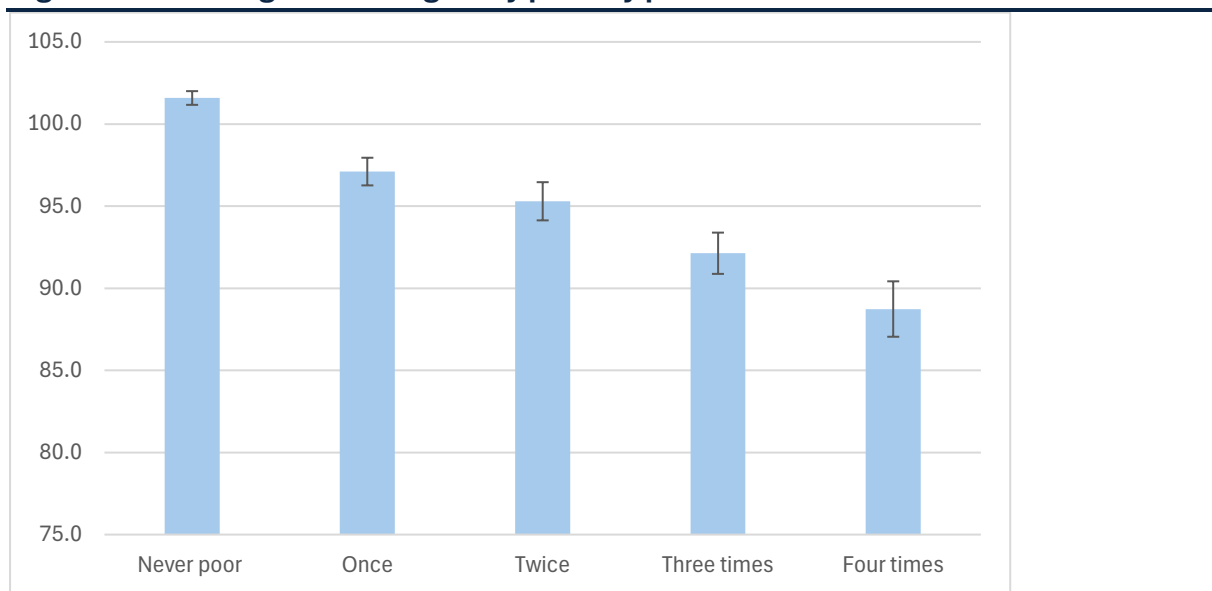
2.2 Association between poverty persistence and educational outcomes: descriptive statistics

Before analysing the processes that account for the relationship between childhood poverty and educational outcomes (Chapter 3), we first consider whether there is a consistent relationship between poverty spells and educational outcomes. To take a holistic approach to educational outcomes, we consider both direct measures of cognitive abilities and children's attitudes to school.

2.2.1 Cognitive development

At age 9, two direct measures of cognitive abilities are considered – the Drumcondra reading score and the selective attention score. For ease of interpretation, we use a standardised score.¹² Figure 2.4 shows that the mean score declines significantly with each additional period of poverty. Those who experience low income/financial stress in all four waves have a reading score of 88.7 compared to a score of 101.6 for the 'never poor' group (a difference of almost one standard deviation). The confidence intervals show that these differences are likely to be statistically significant.

Figure 2.4 Reading score at age 9 by poverty persistence



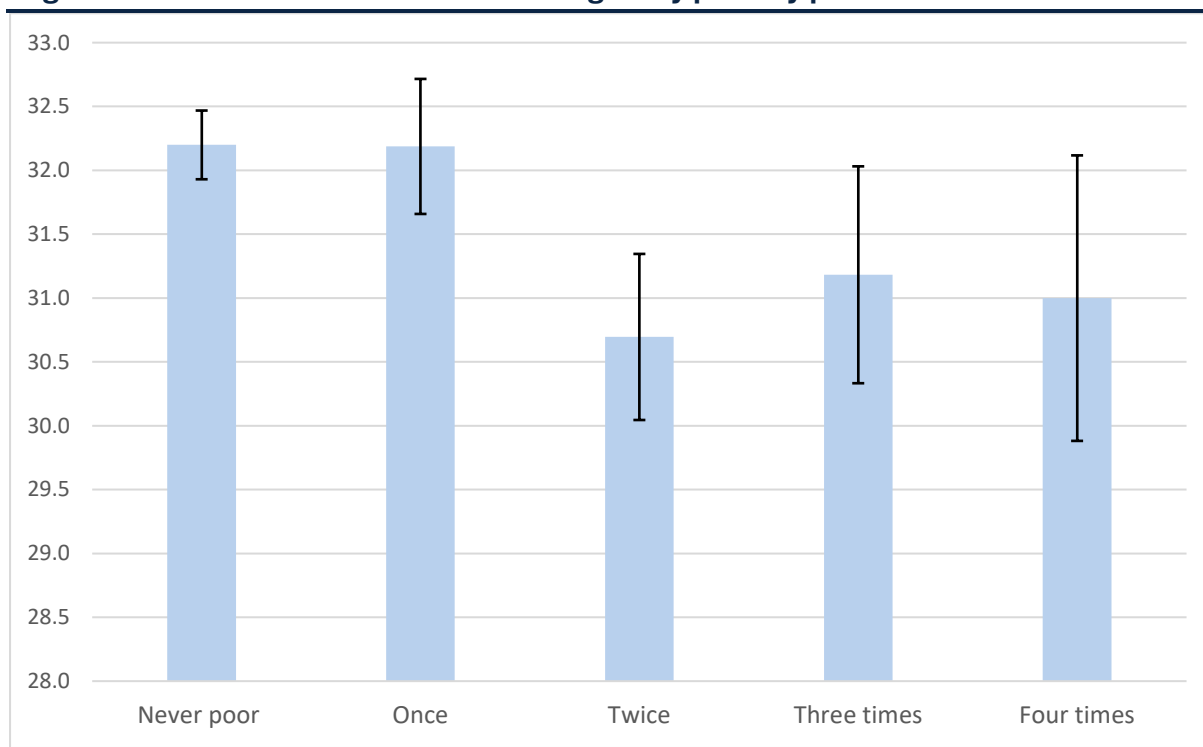
Source: GUI Cohort '08, Wave 5, with 95% confidence intervals.

Note: Standardised Drumcondra score, mean = 100, SD = 15.

¹² Drumcondra reading scores are presented as logit scores (because different class groups take different tests). For ease of interpretation, the values have been transformed to have a mean of 100 and a standard deviation of 15.

The differences in selective attention scores between children experiencing longer durations of poverty is less linear than for reading scores (see Figure 2.5). Only in the case of those experiencing two spells of poverty is the attention score significantly lower than for those with one or no poverty spells.

Figure 2.5 Selective attention score at age 9 by poverty persistence

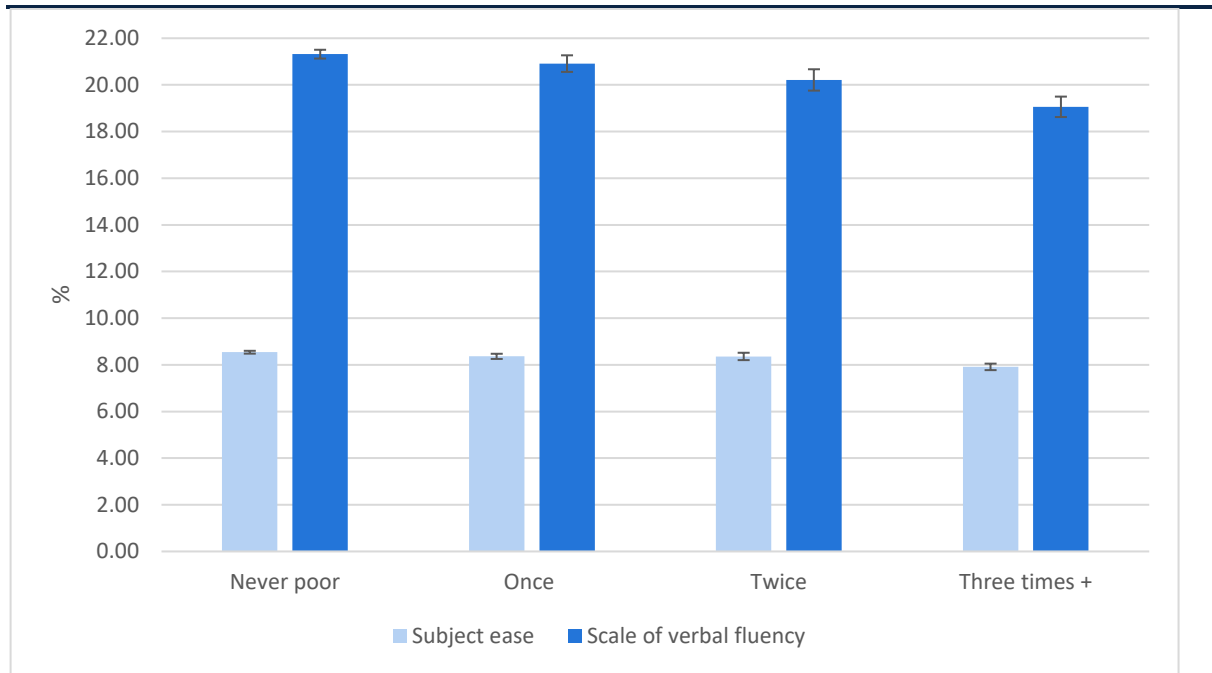


Source: GUI cohort '08, Wave 5, with 95% confidence intervals.

Note: Units relate to selective attention scores.

Although the relationship is weaker than for the two previous outcomes at age 9, a higher number of poverty spells is associated with lower verbal fluency and reduced perceived subject ease at age 13 (Figure 2.6).

Figure 2.6 Perceived subject ease and scale of verbal fluency at age 13 by poverty persistence

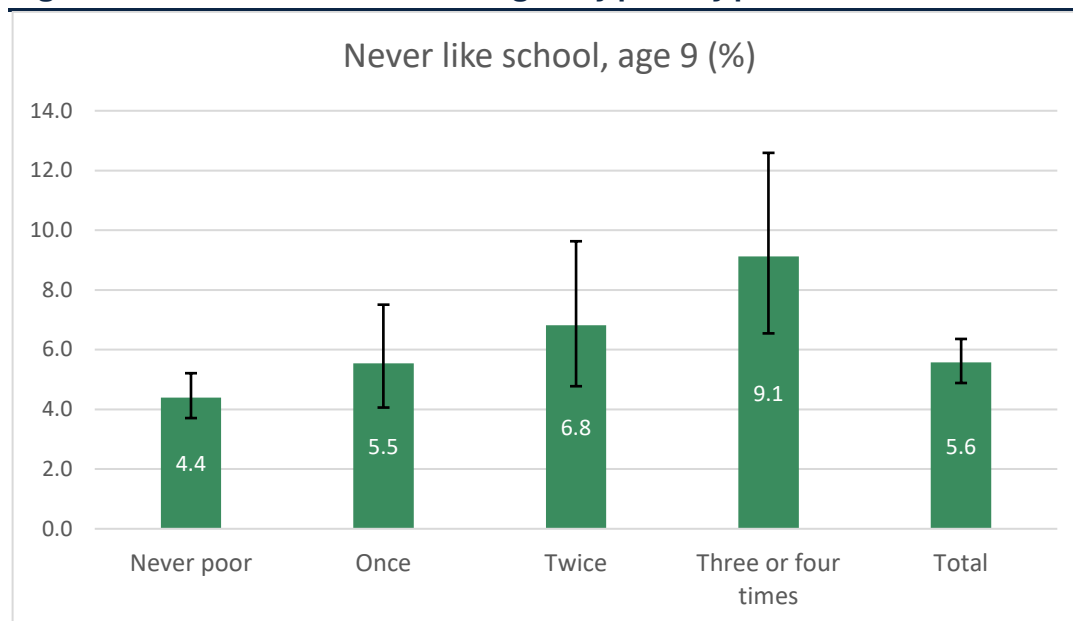


Source: GUI Cohort '08, Wave 5, with 95% confidence intervals.

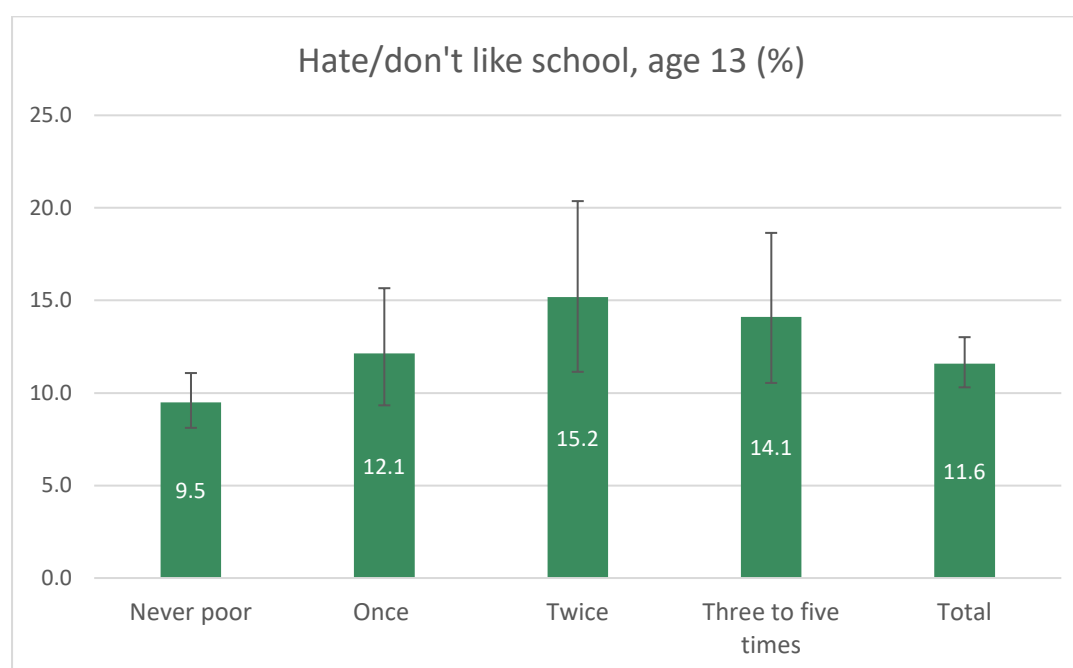
Note: Scale for 'subject ease' ranges from 4 to 12 and for 'verbal fluency' from 5 to 39.

2.2.2 Attitudes to school

At age 9 there is a clear differentiation in the proportion of children who say they never like school by the persistence of poverty (Figure 2.7a). Among those who were never poor, only 4.4 per cent of children say they never like school. This rises to 9.1 per cent among those who were poor three or four times. At age 13, the proportion of children saying they hate or do not like school is higher than at age 9, suggesting that disengagement with school is more likely to emerge in adolescence when young people are in secondary school (Figure 2.7b). Dislike of school is significantly lower among those who were never poor; however, there is less differentiation among those who have experienced poverty at least twice. High spells of poverty are combined in these graphs due to a relatively small number of cases in some sub-groups.

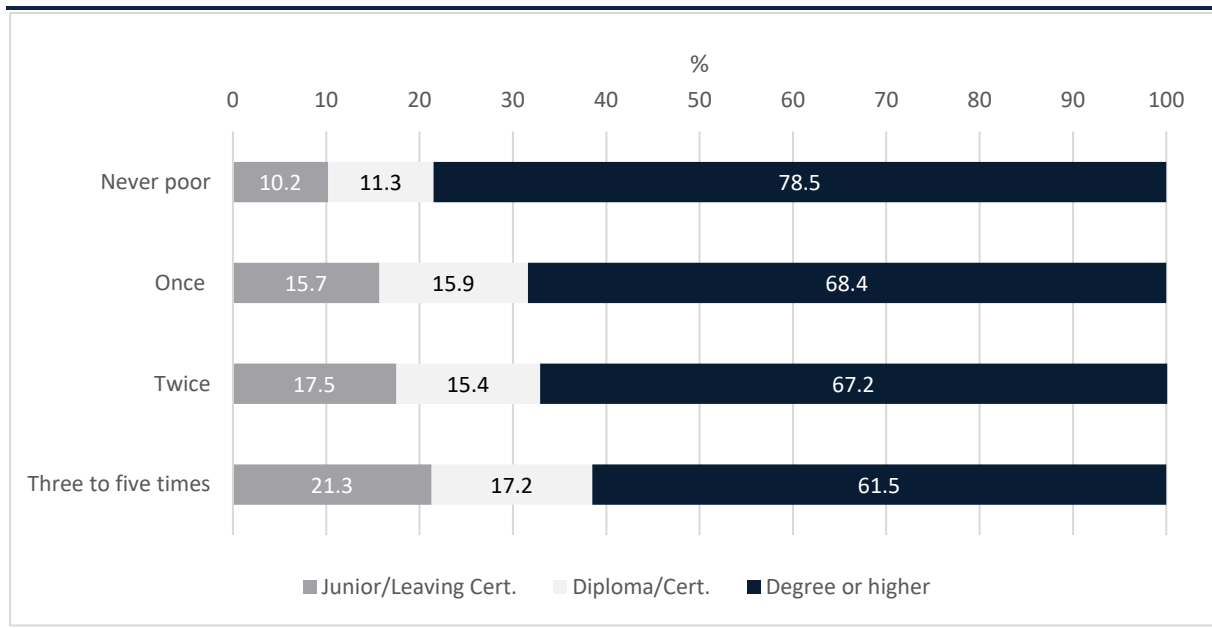
Figure 2.7a Attitudes to school at age 9 by poverty persistence

Source: GUI Cohort '08, Wave 5, with 95% confidence intervals.

Figure 2.7b Attitudes to school at age 13 by poverty persistence

Source: GUI Cohort '08, Wave 6, with 95% confidence intervals.

At age 13, the educational expectations of the young person are strongly patterned by poverty exposure (Figure 2.8). Among those who are never poor, 79 per cent expect to obtain a degree or higher, and this proportion falls to 62 per cent among those who are poor in three or more of the five interviews.

Figure 2.8 Highest qualification expected at age 13 by poverty persistence

Source: GUI Cohort '08, Wave 5.

2.3 Persistent poverty and school DEIS status

At age 9, families in persistent poverty are more likely to attend urban DEIS schools and, to a lesser extent, rural DEIS schools than children of non-poor families. However, the majority of those in poverty are in non-DEIS schools; for example, 64 per cent of those who had three or more spells are not in DEIS schools. At age 13, families in persistent poverty are disproportionately represented in DEIS schools but, as at age 9, the majority are in non-DEIS settings (65 per cent of those with four or more spells). These findings indicate that children living in poverty are more likely to attend DEIS schools but are found in very sizeable numbers in non-DEIS schools.

2.4 Summary

Exposure to low income and/or financial strain at least at one point in early childhood up to age 13 years is relatively common, affecting just over half of children. One in five children experience low income and/or financial strain three or more times by the age of 13. The sequence analyses show a good deal of variation in the timing of these different spells. For some children, the spells are continuous¹³ while others experience more frequent moves in and out of poverty.

¹³ It is worth noting that we do not know about household income and/or financial strain between the interviews.

There is a strong patterning of cognitive outcomes by duration of exposure to poverty. This correlation is weaker in the case of the selective attention score. Attitudes to school are more negative among children with greater exposure to poverty – this pattern is present at both 9 and 13 years. Moreover, children with longer exposure to poverty have lower educational expectations at age 13. In the following chapter, we will investigate the processes underlying the relationship between poverty exposure and educational outcomes.

Chapter 3

Persistent poverty and educational outcomes – what are the underlying processes?

In this chapter, we unpack the processes that lie behind the link between exposure to low income/financial stress in early and middle childhood and educational outcomes. Based on the literature (see Chapter 1), we examine five possible mediating processes:

- Family relationships
- Home learning environment
- Out-of-school activities
- Neighbourhood factors
- Teacher and school factors.

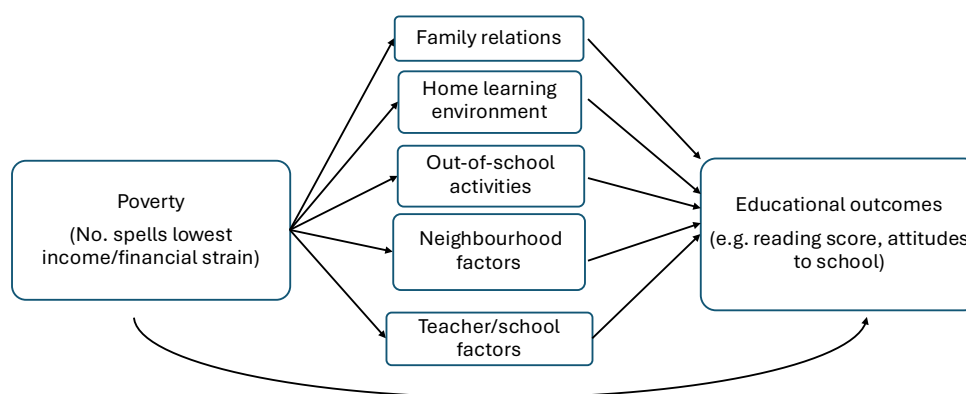
The role of these factors is tested using general structural equation models. These allow us to partition out the direct effects of poverty and the indirect effects that work through the five sets of factors. The conceptual model is presented in Figure 3.1. The only additional factors controlled in the models are the young person's gender and disability status.¹⁴ The analyses do not include other measures of socio-economic background – such as social class and parental education – that are predictive of spells in poverty, and so the estimates reflect the raw effects of poverty (Maître et al., 2021).

We do not include the relationships between the mechanisms as part of the model. Our expectation is that these mechanisms are correlated as they represent different pathways through which the resources of families are reproduced and are likely to reinforce one another. For example, teacher–child relationships may be influenced by children's cultural capital encapsulated in their home learning environment. We find a positive but modest correlation between the items in the home learning environment measure and the teacher–child relationship.¹⁵

¹⁴ Disability status of the child may influence poverty likelihood if the parent(s) needs to give up or reduce paid employment to care for them. Nonetheless, it is important to include this as a control given the strong relationship between disability and child outcomes found in previous research (Smyth, 2024; Smyth and Russell, 2024).

¹⁵ The results showed positive, but modest, associations between teacher–child relationships and the availability of books at home ($r = 0.0413$), being read to by parents ($r = 0.0418$), educational visits ($r = 0.0299$), attendance at concerts ($r = 0.0395$), and library visits ($r = 0.0150$).

Figure 3.1 Conceptual model of direct and indirect effects of poverty exposure and educational outcomes



In the analysis that follows the terms ‘direct’ and ‘indirect’ effects are used in line with the standard terminology for structural equation modelling; they do not imply causality (see Section 1.3.3 on methodology).

3.1 Poverty and educational outcomes at age 9

3.1.1 Reading scores at age 9

Figure 3.2 provides a visualisation of the direct and indirect effects of poverty persistence (measured as low income/financial difficulty) on reading scores at age 9. Each of the potential groups of mediating factors (estimated as latent variables in the structural equation models) are examined in turn: family relationships, home learning environment, out-of-school activities, school effects and neighbourhood effects. The values shown for the direct and indirect effects in Figure 3.2 and Table 3.2 represent path coefficients estimated from the gsem model.¹⁶

The importance of family relationships in mediating the effect of poverty is highlighted in the family stress model (see Chapter 1). This model hypothesises that poverty is a significant stressor as parents

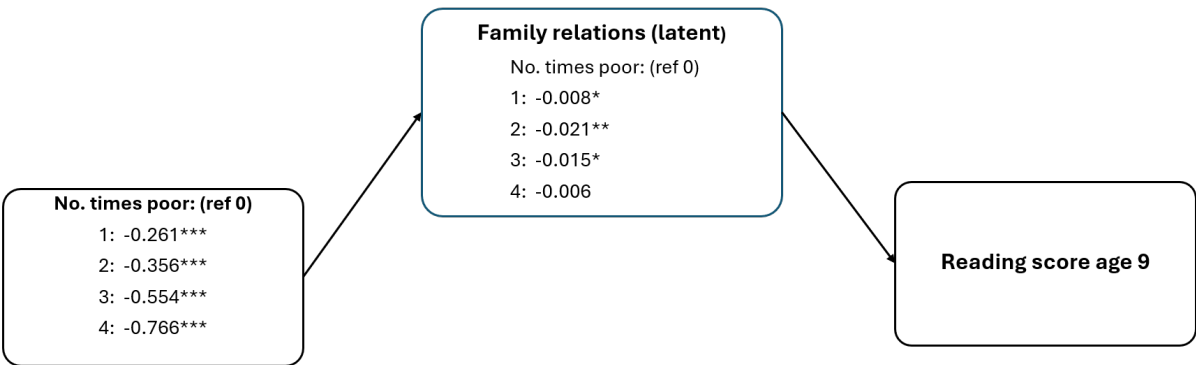
¹⁶ Similarly, results presented for the other mediators in the chapter are also path coefficients. These should be interpreted in the same way as regression coefficients.

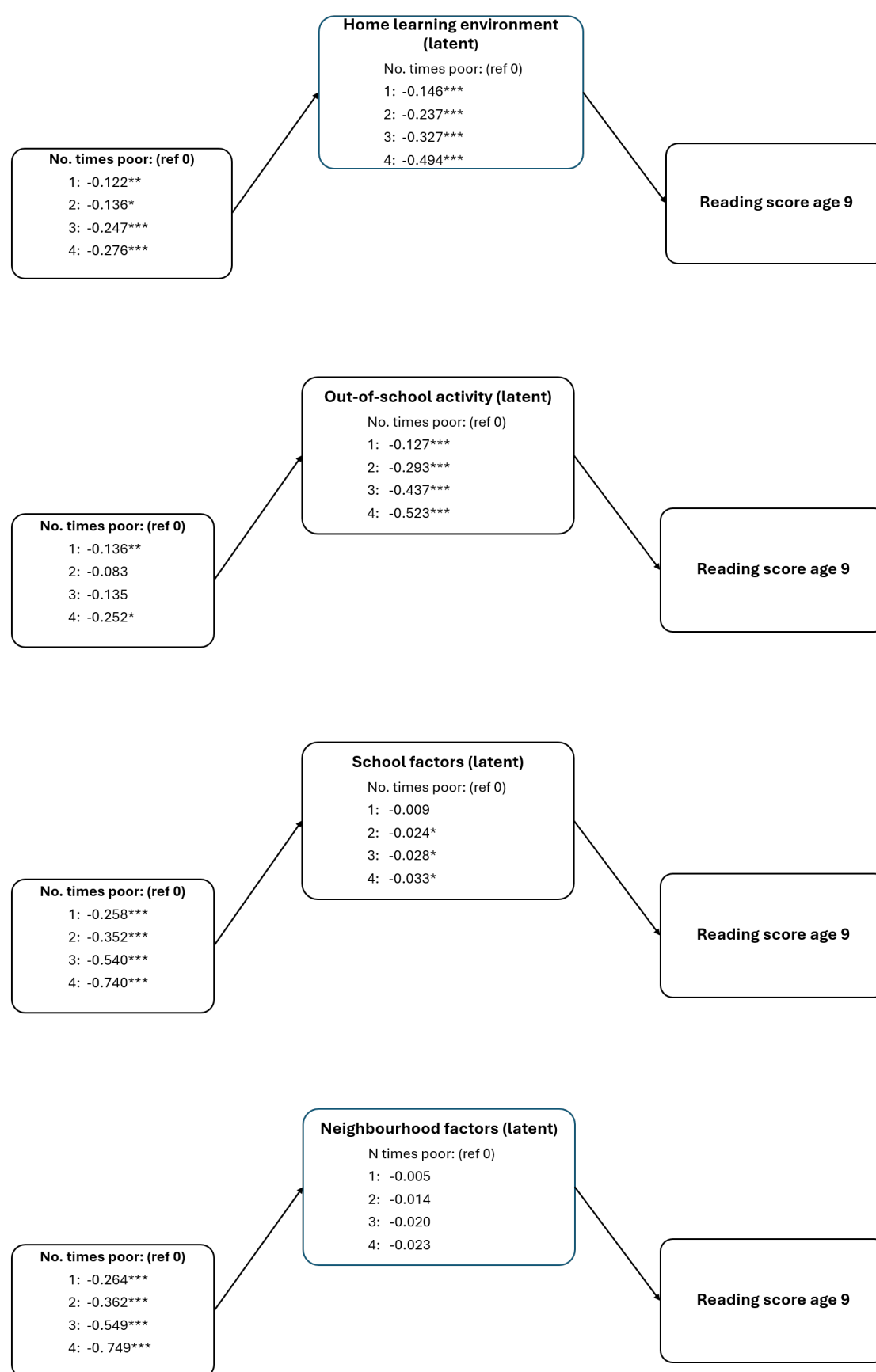
struggle to make ends meet and respond to household needs. These stresses negatively affect the quality of relationships within families, which impacts on child development. The indicators used to measure family relationships are closeness and conflict in the parent and child relationship, parenting stress, and harsh parenting; these scales are combined into a latent variable estimated in the structural equation model.

The first panel of Figure 3.2 measures the direct influence of poverty persistence on reading scores and the indirect influence via family relationships. The direct effect of poverty increases with its duration; for example, being poor in all four waves is associated with a reduction of -0.766 in the Drumcondra reading score. The indirect effects of poverty via family relations are small but statistically significant, except for those in poverty in all four waves.

A more substantial part of the variation in reading scores can be attributed to the relationship between poverty and home learning environment (HLE) (panel 2, Figure 3.2). HLE consists of factors such as reading to the child, going on educational visits, etc. (see Table 1.2). The indirect effect of HLE is significant and increases with longer durations of poverty, suggesting that this is an important pathway for the link between poverty persistence and lower reading scores. Once the indirect effects of HLE are taken into account, the direct effects of poverty persistence are smaller but still significant and rise with duration.

Figure 3.2 Direct and indirect effects of poverty duration on reading score at age 9





Source: GUI Cohort '08, Wave 5.

Note: *** p<.001; ** p<.01; * p<.05.

Out-of-school activities are indicators of the child's involvement in organised sports and arts/cultural activities. Like HLE, there is a strong indirect relationship between poverty and reading scores via out-of-school activities. There is a negative relationship between poverty duration and these activities, and those with higher activity scores also score better on the reading test.

A smaller part of the relationship between poverty persistence and reading scores operates via primary school characteristics. This is again measured as a latent variable based on frequency of positive and negative interactions with the teacher, scales of teacher closeness and conflict with the child, and whether the child attends a DEIS school (see Chapter 1 for details). There is no indirect effect through school characteristics for the group that are poor once, but there is a small and statistically significant effect for those poor two or more times (the coefficients are very similar for two, three or four times).

The final potential mediator tested is a latent measure of neighbourhood characteristics (based on social capital in neighbourhood, neighbourhood quality and urban/rural location). There is no indirect relationship via neighbourhood factors between poverty persistence and reading score at age 9, suggesting that this is not a relevant pathway for this educational outcome at age 9.

3.1.2 Selective attention scores at age 9

At 9 years of age, children also completed a test of selective attention. As shown in the previous chapter, there is a much weaker relationship between poverty persistence and this outcome. This is reflected in the lack of significant total effects in the structural equation models of selective attention, except for the group that have experienced poverty in two waves (see Table A2 in the appendix). Nevertheless, the mediation models do reveal significant indirect relationships. Firstly, there is a significant indirect relationship between poverty and selective attention via HLE that increases with poverty persistence (Table 3.1). In other words, those with longer poverty duration have lower HLE, which in turn is associated with lower selective attention scores. Secondly, there is a similar and even stronger relationship via out-of-school activities. The results suggest that such activities are particularly beneficial for developing selective attention. The indirect

effect of parent–child relationship, school characteristics or neighbourhood characteristics is not found to be significant.

3.1.3 Attitudes to school at age 9

In addition to test scores, we also examine attitudes to school as these have been identified as a strong predictor of longer term educational outcomes (see, for example, Goodman et al., 2011). As discussed in Chapter 2, attitudes to school at age 9 are broadly positive, with only a small number saying they never like school. The outcome is coded as 1 for ‘never like school’, 2 for ‘sometimes like’ and 3 for ‘always like’; therefore, higher scores indicate a more favourable attitude. The mediation models show there is no significant direct (or total) effect of poverty persistence on attitude to school at age 9 (see Table 3.1). Nevertheless, significant relationships are found for four of the five mediators examined. There is a small, non-linear, indirect effect through parent–child relationship, except for the small group that are poor in all four waves. Somewhat larger indirect relationships are found for HLE, out-of-school activities and school characteristics; in the case of each of these mediators, the size of the effect increases with poverty duration. These results show that while poverty persistence has little direct effect on attitude to school at age 9, it has an indirect effect through its (negative) impact on school–teacher relationships, out-of-school activities and, to a lesser extent, home learning environment and parent–child relationships.

Table 3.1 GSEM coefficients on educational outcomes at age 9

	No. times poor	Parent-child relations	HLE	Neighbourhood factors	School & teacher factors	Out-of-school activities
Selective attention						
Direct effect	1	-0.049	0.230	-0.068	-0.027	0.365
	2	-1.407***	-0.993*	-1.457***	-1.356**	-0.498
	3	-0.964	-0.301	-0.989	-0.880	0.472
	4	-1.063	-0.007	-1.061	-0.926	0.537
Indirect effect						
	1	-0.024	-0.297**	-0.004	-0.041	-0.416**
	2	-0.063	-0.470**	-0.011	-0.110	-0.951***
	3	-0.046	-0.701**	-0.015	-0.125	-1.478***
	4	-0.019	-1.067**	-0.017	-0.148	-1.625***
Total effect						
	1	-0.073	-0.068	-0.072	-0.069	-0.051
	2	-1.469***	-1.462***	-1.468***	-1.466***	-1.449***
	3	-1.010	-1.003	-1.004	-1.005	-1.005
	4	-1.083	-1.074	-1.078	-1.074	-1.088
Attitude to school						
Direct effect	1	-0.009	-0.002	-0.016	0.012	0.011
	2	-0.004	-0.001	-0.023	0.047	0.036
	3	0.014	0.034	0.003	0.074	0.092*
	4	-0.045	0.002	-0.047	0.047	0.052
Indirect effect						
	1	-0.009*	-0.015*	-0.001	-0.026	-0.026**
	2	-0.022***	-0.023*	-0.002	-0.070***	-0.060***
	3	-0.017**	-0.035*	-0.003	-0.075**	-0.093***
	4	-0.007	-0.053*	-0.004	-0.099**	-0.102***
Total effect						
	1	-0.017	-0.016	-0.017	-0.014	-0.015
	2	-0.026	-0.025	-0.025	-0.023	-0.024
	3	-0.002	-0.000	-0.001	-0.001	-0.001
	4	-0.052	-0.051	-0.051	-0.052	-0.051
N						
		7,476	7,476	7,476	7,471	7,476

Source: GUI Cohort '08, Wave 5.

Notes: The reference category in all cases is 'no spells in poverty'.

*** p<.001, ** p<.01, * p<.05.

3.2 Poverty and educational outcomes at age 13

We undertake a similar analysis of the processes that potentially mediate the effects of poverty persistence on a range of educational outcomes at age 13. In these analyses, the maximum number of periods in which the family are in poverty is five.

3.2.1 Verbal fluency at age 13

The measure of verbal fluency at age 13 is less detailed than the reading score measure at age 9, due to a switch to telephone mode for this wave because of the ongoing Covid pandemic-related restrictions. There is a strong relationship between verbal fluency and poverty duration as can be seen from the total effect coefficients in Table 3.2, with a significant reduction associated with each additional period of poverty.

The extent to which this total effect is mediated through the five factors is shown by the indirect effects. These are represented graphically in Figure 3.3. There is no indirect pathway through parent–child relationship, out-of-school activities or neighbourhood factors. However, home learning environment and school factors play a significant role in explaining the relationship between poverty and verbal fluency. In both cases, the indirect effects increase with the number of times the family experience poverty. The mediated effect of HLE is large, and relative to the total effect it plays an important role in the total association between poverty and verbal fluency. In the case of school factors, the magnitude of the indirect effect varies considerably across exposure to poverty, representing a smaller component of the total effect for those poor in all five periods and a much larger component for those poor in one period (though the total effect is insignificant).

Table 3.2 GSEM total effects of poverty duration on verbal fluency score at age 13

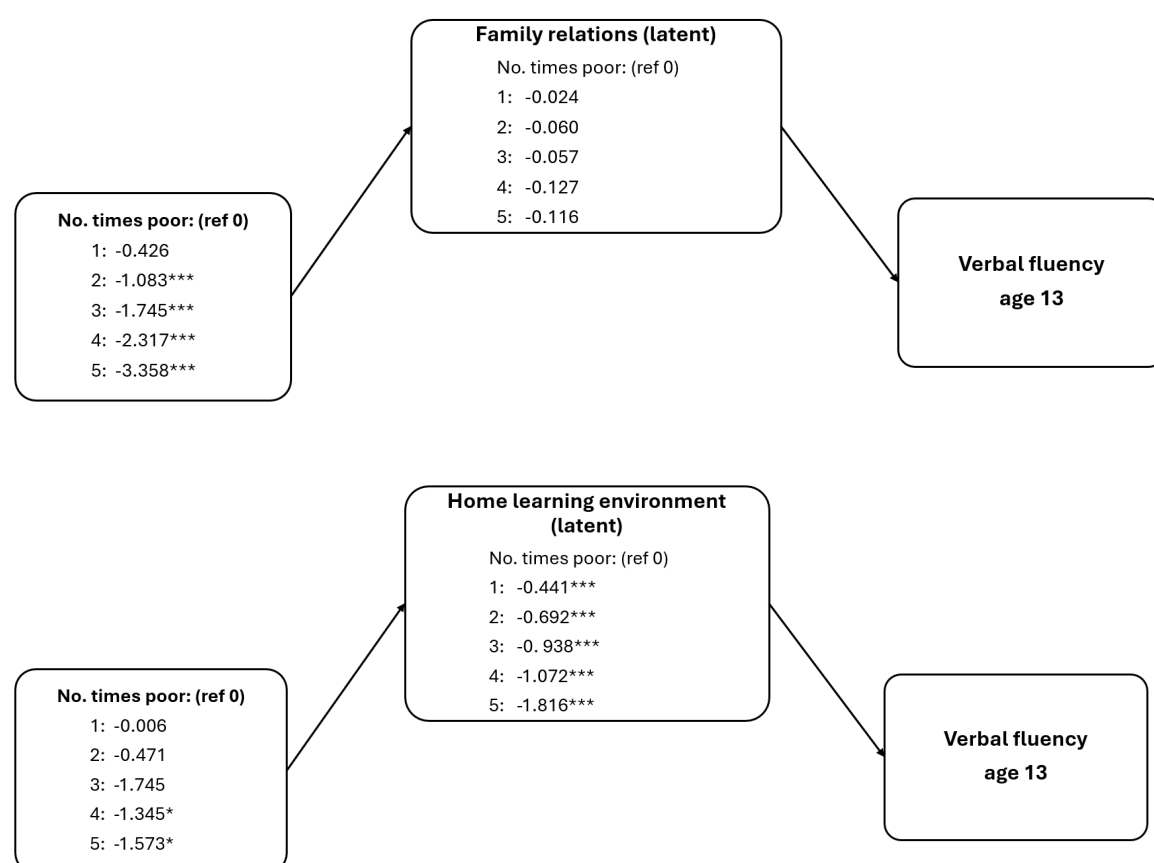
	No. times poor	Parent-child relations	HLE	Neighbourhood factors	School factors	Out-of-school activities
Total effect	1	-0.450	-0.435	-0.433	-0.433	-0.383
	2	-1.142***	-1.163***	-1.137***	-1.139***	-1.142***
	3	-1.802***	-1.744***	-1.784***	-1.772***	-1.741***
	4	-2.445***	-2.417***	-2.425***	-2.427***	-2.373***
	5	-3.473***	-3.389***	-3.426***	-3.409***	-3.388***
	N	6,031	6,031	6,031	6,023	5,814

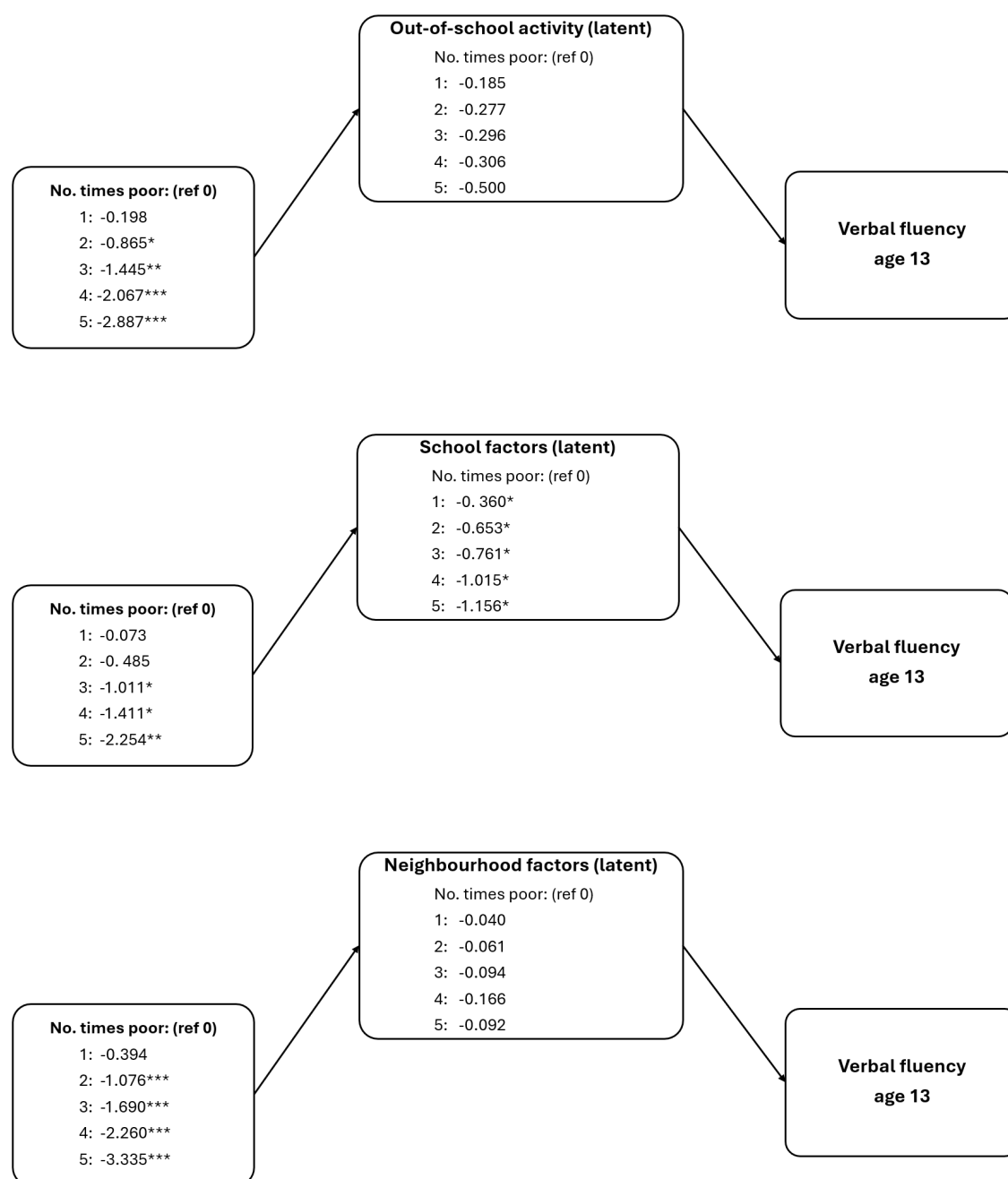
Source: GUI Cohort '08, Wave 6.

Notes: The reference category in all cases is 'no spells in poverty'.

*** p<.001, ** p<.01, * p<.05.

Figure 3.3 Direct and indirect effects of poverty duration on verbal fluency at age 13





Source: GUI Cohort '08, Wave 6.

Note: *** p<.001; ** p<.01; * p<.05.

3.2.2 Poverty and perceived ease of subjects at age 13: mediating processes

A second measure of academic ability is the young person's perception of the ease/difficulty of a number of core subjects (English, Irish, Maths and Science); a higher score implies that they find the subjects easier (with a potential range from 4 to 12). Overall, those who were poor in three or more periods are significantly less likely to find the subjects easy compared to those with no periods of poverty (see total effects in Table 3.3). We find that this effect is not mediated by parent-child relationships. Home learning environment and out-of-school activities are the strongest mediators of the poverty effect. Weaker indirect effects are found for school factors and neighbourhood factors. In both cases, these indirect effects are only observed for those with one or two periods of poverty.

Table 3.3 Direct and indirect effects of poverty persistence on subject ease at age 13

	No. times poor	Parent-child relationship	HLE	Neighbourhood factors	School factors	Out-of-school activities
Direct effect	1	-0.129	-0.041	-0.116	0.133	-0.057
	2	-0.043	0.078	-0.036	0.451	0.024
	3	-0.554***	-0.362**	-0.528***	0.068	-0.465***
	4	-0.303	-0.130	-0.280	0.454	-0.239
	5	-0.664**	-0.306	-0.661**	0.234	-0.553*
Indirect effect	1	-0.016	-0.097**	-0.022*	-0.273*	-0.070**
	2	-0.035	-0.150**	-0.034*	-0.523*	-0.094**
	3	-0.037	-0.204***	-0.053*	-0.647	-0.099*
	4	-0.080	-0.232***	-0.093*	-0.837	-0.114*
	5	-0.075	-0.395***	-0.051	-0.941	-0.152*
Total effect	1	-0.145	-0.138	-0.139	-0.140	-0.127
	2	-0.078	-0.072	-0.070	-0.073	-0.070
	3	-0.591***	-0.566***	-0.581***	-0.579***	-0.564***
	4	-0.384*	-0.362*	-0.373*	-0.383*	-0.353*
	5	-0.739**	-0.701**	-0.712**	-0.707**	-0.705**
N	6,031	6,031	6,031	6,024	5,812	

Source: GUI Cohort '08, Wave 6.

Notes: The reference category in all cases is 'no spells in poverty'.

*** p<.001, ** p<.01, * p<.05.

3.2.3 Poverty and attitudes to school at age 13: mediating processes

As was the case at age 9, the relationship between poverty and attitude to school was examined. At age 13, a young person's attitude to school is measured on a five-item scale ranging from 'like very much' to 'don't like/hate'. The total effect of poverty persistence on attitude to school is relatively small and only statistically significant for two and three periods of poverty (compared to 'never poor') (Table 3.4). As might be expected, school-level processes – such as positive and negative interactions with teachers – play the most significant roles in mediating poverty effects. Interestingly, when these mediating effects are taken into account, the direct effect of poverty duration is positive; this means that poverty is only driving poorer attitudes to school when it is associated with poorer teacher and school experiences.

Child–parent relationships play no mediating role between poverty and school attitudes. Home learning environment and out-of-school activities both play a mediating role, meaning that poverty is associated with less favourable attitudes to school, partly because young people have fewer resources in the home that support education and are less involved in out-of-school activities. When the indirect relationship through HLE is taken into account, there is no remaining direct effect of poverty persistence.

Finally, we find that neighbourhood environment also mediates the relationship between poverty and school attitudes, suggesting that neighbourhoods can influence the normative context of education for young people at age 13, in a way that was not present at age 9.

3.2.4 Poverty and educational expectations at age 13: mediating processes

The results in Chapter 2 showed that young people who had experienced more periods of poverty had lower educational expectations at age 13. This is also evident in the 'total effect' in the GSEM (Table 3.4, second panel). As with all of the other educational outcomes at age 13, there is no indirect effect via parent–child relationships. Nor is there an indirect effect through neighbourhood characteristics.

As was found for attitudes to school, the factors with the largest mediating effect are school characteristics; when these are taken into account, there is no remaining direct effect of poverty duration on educational expectations. Home learning environment and out-of-school activities are also relevant processes mediating the relationship between poverty and educational expectations.

Table 3.4 Direct and indirect effects of poverty persistence on attitudes to school and educational expectations at age 13

Mediators	No. times poor	Parent-child relationship	HLE	Neighbourhood factors	School factors	Out-of-school activities
Attitude to school						
Direct effect	1	-0.075	-0.038	-0.058	0.169*	-0.040
	2	-0.150*	-0.114	-0.140*	0.368**	-0.130*
	3	-0.215**	-0.139	-0.181**	0.562***	-0.177**
	4	-0.104	-0.054	-0.067	0.787***	-0.089
	5	-0.006	0.121	-0.004	0.966***	0.021
Indirect effect	1	-0.013	-0.040**	-0.023**	-0.251***	-0.034**
	2	-0.028	-0.062**	-0.036**	-0.552***	-0.045**
	3	-0.030	-0.085**	-0.055**	-0.800***	-0.048*
	4	-0.066	-0.096**	-0.094***	-0.967***	-0.055*
	5	-0.062	-0.165***	-0.053	-1.032***	-0.072*
Total effect	1	-0.088	-0.078	-0.081	-0.082	-0.074
	2	-0.178**	-0.176**	-0.176**	-0.183**	-0.175**
	3	-0.244***	-0.223**	-0.236***	-0.238***	-0.225**
	4	-0.170	-0.150	-0.161	-0.180	-0.144
	5	-0.067	-0.044	-0.057	-0.066	-0.051
Educational expectations						
Direct effect	1	-0.100***	-0.070**	-0.099***	-0.046	-0.086***
	2	-0.099**	-0.060	-0.105***	-0.002	-0.088**
	3	-0.159***	-0.096*	-0.160***	-0.040	-0.140***
	4	-0.116**	-0.053	-0.123**	0.033	-0.103*
	5	-0.156*	-0.040	-0.167*	0.010	-0.140
Indirect effect	1	-0.003	-0.030***	-0.000	-0.055**	-0.012**
	2	-0.007	-0.046***	-0.000	-0.102**	-0.017**
	3	-0.007	-0.063***	-0.000	-0.120**	-0.018*
	4	-0.015	-0.072***	-0.000	-0.161**	-0.020*
	5	-0.013	-0.124***	-0.000	-0.182**	-0.027*
Total effect	1	-0.103***	-0.100***	-0.099***	-0.101***	-0.098***
	2	-0.106***	-0.106***	-0.105***	-0.104***	-0.105***
	3	-0.166***	-0.159***	-0.160***	-0.160***	-0.158***
	4	-0.131**	-0.125**	-0.123**	-0.128**	-0.123**
	5	-0.170*	-0.164*	-0.167*	-0.172*	-0.166*
N		6,031	6,031	6,031	6,019	5813

Source: GUI Cohort '08, Wave 6.

Notes: The reference category in all cases is no spells in poverty.

*** p<.001, ** p<.01, * p<.05.

3.3 Models including all potential mediating factors

The structural equation models outlined above describe the pathways through which five sets of processes mediate the relationship between childhood poverty and educational outcomes. However, given the nature of the computations involved, it was not possible to estimate a model that included all five mediating processes at once.¹⁷ Therefore, in order to examine the simultaneous influence of these five sets of factors, and to get a sense of which has the strongest association with educational outcomes, we estimated a series of regression and logit models. These models are included in the appendix (Tables A2, A4 and A5).

The models addressing educational outcomes at age 9 confirm that the number of periods of poverty has the strongest relationship with reading scores. This relationship is reduced but remains significant in the model with all five sets of processes controlled. Individual variables from five sets of explanatory processes (family relations, HLE,¹⁸ out-of-school activities, neighbourhood factors and school factors) remain significant when all are considered simultaneously. Only neighbourhood characteristics have no significant influence. The relative influence of the five sets of factors is further examined using a Shapley decomposition (Shorrocks, 2013), which assesses the contribution of each set to the total variance explained by the model (Table A3).¹⁹ This confirms that out-of-school activities and HLE account for more than 30 per cent of the variance explained. Even controlling for all five mediating factors, poverty exposure accounts for 12 per cent of the variance explained. For selective attention test scores at age 9, there is a weaker relationship with poverty in the base model. Only experiencing two periods of poverty is significantly negatively associated with attention scores. When all sets of

¹⁷ We were unable to estimate a model including all five mediators simultaneously. The limitation was not due to model mis-specification or convergence failure, but rather to the substantial computational burden associated with estimating a model of this complexity. We successfully estimated models including a smaller number of mediators, but computation time increased considerably with each additional mediator. When all five mediators were included, the estimation process ran for several days while making only minimal progress through the convergence iterations. To address this issue, we implemented several strategies recommended in the literature to improve computational efficiency within Stata. Despite this, computation times remained extremely long, preventing completion of the estimation within a reasonable timeframe.

¹⁸ ‘Listening to the child read’ has a negative association with reading score; it is likely that this arises because children facing more reading difficulties at this age need more parental input.

¹⁹ This is based on the adjusted R squared in the case of reading scores and other continuous variables and the pseudo R squared in binary logit models.

processes are together, HLE has no significant effect on selective attention and there are almost no significant school effects. Out-of-school activities have a significant positive relationship with selective attention, particularly reading for pleasure and involvement in team sports and music activities. Among the parent–child relationship variables, children who experience the lowest levels of harsh parenting have higher attention scores. Among neighbourhood characteristics, only being a rural dweller has a significant effect when other processes are controlled. Overall, relatively little of the variation in selective attention (4 per cent) is explained in the full model. The Shapley decomposition confirms that out-of-school activities account for a higher percentage of the variance explained than the other mediating factors.

Turning to never liking school (the outcome has been recoded to a binary variable for ease of interpretation), there is no significant effect of poverty persistence in the base or full model. The final model indicates that school-level factors remain most influential when all processes are considered together. Children who have more positive interactions and fewer negative interactions with teachers are much less likely to say they never like school. Lower conflict with and higher closeness to the child, as reported by the teacher, have a similar relationship. The Shapley decomposition shows the school factors account for most of the variance explained (61 per cent). Among the family processes, only parental conflict is significant (lower conflict is associated with a lower odds of never liking school), and reading for pleasure is the only significant out-of-school activity in the full model, while HLE and neighbourhood variables have no significant effect. Poverty exposure accounts for less than 1 per cent of the variance explained when all mediating processes are considered (see Table A3 in the appendix).

Similar models were estimated for the age 13 outcomes including all five processes together (Tables A4 and A5 in the appendix). Verbal fluency is strongly associated with poverty duration in the base model; this association is reduced when all five processes are controlled, yet it remains statistically significant for each duration. There remains a significant relationship between parent–child relations and verbal fluency when other factors are controlled. HLE is also still significant, even though many of the characteristics were measured at age 9. Out-of-school activities, especially participation in cultural activities and reading for pleasure, are strongly correlated with verbal fluency,

though it is likely that the relationship with reading for pleasure runs both ways. Among the school-level processes, positive interaction with teachers is associated with higher verbal fluency scores even when all other processes are controlled. There is no neighbourhood effect in the full model. The Shapley decomposition shows that out-of-school activities account for 37 per cent of the variance explained by the full model, compared to 23 per cent for HLE, 16 per cent for school factors, and around 3 per cent each for parent–child relationships and neighbourhood factors (see Table A6).

Those who experienced poverty three or more times are significantly more likely to find their school subjects difficult at age 13 in the base model. When all five processes are included, the most persistent poverty (four or five times) becomes non-significant. In the full model, school processes and out-of-school activities stand out in terms of significance. Positive teacher interactions enhance perception of subject ease, while negative interactions detract (though causality may also run the other way). DEIS school status at age 13 is associated with lower subject ease even when individual-level poverty is taken into account. Taken together, school factors account for 47 per cent of the variance explained (see Table A4). All three out-of-school activities have a significant positive association with finding subjects easier; collectively they account for over a fifth of the variance explained. Among the HLE variables only ‘books in the home’ is significant. Therefore, while HLE is an important mediator of poverty for this outcome, its independent effect, when poverty and other processes are controlled, is relatively small. Neighbourhood factors are insignificant, and only low parental conflict is significant among the family relations factors.

To analyse attitudes to school, the variable has been dichotomised into those who never like/hate school and all others. In the base model, young people who experienced poverty twice or three times are significantly more likely to never like school; the longest durations are insignificant, which is likely to reflect the small size of these groups (Table A5). School factors are among the most significant predictors of never liking school, particularly negative interactions with teachers, with the possibility that this relationship is bi-directional. Out-of-school activities, particularly reading for pleasure and involvement in team sport, are associated with a lower likelihood of never liking school, net of poverty and other processes. Combined with the GSEM results, this suggests involvement in such activities may be beneficial

both through reducing the negative influence of poverty and through direct effects on increasing school engagement. The Shapley decomposition confirms that out-of-school activities, and especially school factors, contribute most to accounting for variation in disliking school (Table A6).

As shown in Chapter 2, poverty persistence is strongly associated with educational expectations at age 13. The model (Table A5) shows the odds of expecting to reach degree level or above versus lower levels of education. In the base model, those experiencing poverty in all waves are half as likely to expect to achieve a degree as those who are never poor, while those who are poor once are over a third less likely. When all five processes are taken into account, poverty still plays a role, though the size of the effect reduces somewhat and the two longest durations become statistically insignificant, which may be due in part to the small group size. Neighbourhood factors are not significant. Only two of the HLE factors are significant (number of books in home and attending concerts). Interactions with teachers, both positive and negative, are strongly associated with educational expectations, and being in a DEIS school is associated with lower educational expectations, even when individual-level poverty and important non-school processes are taken into account. Out-of-school activities (reading and team sports) are positively associated with educational expectations alongside their mediating effect on poverty shown in the SEM. The Shapley decomposition shows that of the five explanatory mechanisms examined, school factors account for the greatest share of explained variation in educational expectations, followed by out-of-school activities (Table A6).

3.4 Summary

This chapter set out to investigate the processes that contribute to the link between poverty persistence and educational outcomes through a series of structural equation models. The factors found to mediate the effects of poverty for each outcome at age 9 are summarised in Table 3.5, and at age 13 in Table 3.6. At age 9, we find that out-of-school activities and HLE have the most consistent effects in mediating the effects of poverty, being significant for all outcomes. Parent-child relationships play a weaker mediating role in reading scores and school attitudes, but not for selective attention. The same pattern is seen for school factors, but these are the strongest mediating effect for school attitudes (alongside out-of-school activities). Neighbourhood

plays no role in mediating the effects of poverty on educational outcomes at age 9. The total effect of poverty on these outcomes is strongest for reading score and weakest for attitude to school.

Table 3.5 Summary table of results at age 9 – factors mediating effect of poverty persistence on educational outcomes

Mediators	Outcomes		
	Reading score	Selective attention score	Attitude to school
Parent–child relationship	Y	N	Y
HLE	Y	Y	Y
Out-of-school activity	Y	Y	Y
School factors	Y (2+ times poor)	N	Y
Neighbourhood factors	N	N	N

Source: GUI Cohort '08, Wave 5.

Note: For each outcome the largest indirect effects are in bold/red. Unless otherwise stated the indirect (mediating) effect is significant for each poverty duration.

At age 13, we find that the mediating effect of family relationships disappears while the mediating effect of neighbourhood now emerges. This is likely to reflect the developmental stage of the young people, as peer groups and community become more important in adolescence (Leventhal, 2018). Home learning environment continues to play a significant mediating role at age 13 and is significant for all four outcomes, but is particularly strong for the indirect relationship between poverty and the cognitive outcomes (verbal fluency and subject ease). School factors are also significant mediators for all four outcomes but are particularly important for attitudes and expectations. Out-of-school activities are significant mediators in three of the outcomes. These results suggest that focusing on different pathways may be necessary depending on which educational outcomes the policy is trying to address for young people experiencing poverty.

Table 3.6 Summary table of results at age 13 – factors mediating effect of poverty persistence on educational outcomes

Mediators	Outcomes			
	Verbal fluency score	Subject ease	Attitude to school	Educational expectations
Parent–child relationship	N	N	N	N
HLE	Y	Y	Y	Y
Out-of-school activity	N	Y (except 5 times poor)	Y	Y
School factors	Y	Y (only for 1 & 2 times poor)	Y	Y
Neighbourhood factors	N	Y	Y (except 5 times poor)	N

Source: GUI Cohort '08, Wave 6.

Note: For each outcome the largest indirect effects are in red. Unless otherwise stated the indirect (mediating) effect is significant for each poverty duration.

The regression and logit analyses of all sets of processes together further reveal the factors that have an independent relationship with educational outcomes when poverty is already taken into account. These highlight the potential levers for improving educational outcomes for all children, regardless of background, with relationships with teachers and out-of-school activities emerging as particularly consistent factors at age 13.

Chapter 4

Conclusions and implications for policy

4.1 Background to the study

The link between child poverty and poorer educational outcomes has been well established in Ireland and internationally (Cooper and Stewart, 2021; Maître et al., 2021). However, less attention has been given to the mechanisms explaining this relationship. This report uses data on Cohort '08 of the Growing Up in Ireland study to identify the processes whereby persistent poverty impacts on children's educational development. It adopts a broad perspective on educational outcomes, including not only measures of cognitive development but also the young person's perspective on school and their school subjects. The main research questions addressed in the study are:

- How does experience of persistent poverty, measured in terms of spells of low income and/or economic strain, impact on children's cognitive development, and attitudes to school and to school subjects, measured at ages 9 and 13?
- To what extent is this effect explained by the impact of persistent poverty on family relationships, home learning environment, out-of-school activities, and neighbourhood, teacher and school factors?

The study provides an important evidence base for policy by identifying potential levers for intervention. This is all the more crucial given consistent evidence that children and young people in Ireland are more likely than other groups to live in households experiencing poverty/low income and material deprivation (CSO, 2025).

4.2 Persistent poverty and cognitive development

By the time children were 9 years of age, almost half (45 per cent) of families had experienced low income and/or financial strain at least once; by age 13, this had increased to 51 per cent of families. A fifth of families had experienced three or more waves of persistent poverty by age 13; this was the case for 14 per cent of the families of 9-year-olds.

At age 9, cognitive development was measured in terms of performance on the nationally standardised Drumcondra reading test and on a selective attention test. Reading test scores were found to

decline significantly with each additional spell of poverty. Structural equation models were used to explore the extent to which these patterns were partially explained by the impact of poverty on family relationships, home learning environment, out-of-school activities, and neighbourhood, teacher and school factors. The strongest mediating effects were found for home learning environment (at age 9) and for out-of-school activities. Thus, a good deal of the impact of poverty on reading performance is due to less access to books, cultural and other leisure activities for children living in poor households. More mother–child conflict and poorer family relationships did have a negative relationship with reading scores but explained only a modest amount of the effect of persistent poverty. In addition, teacher and school factors at primary level were associated with reading performance but explained only a little of the effect of poverty. This may reflect the fact that many children living in poverty attend non-DEIS schools and that positive attitudes to school at age 9 were common across all social groups. No significant relationship was found between neighbourhood characteristics and reading test score.

In contrast to reading test scores, there was little systematic variation in selective attention test scores by exposure to persistent poverty. This is perhaps not surprising given the test does not measure accumulated knowledge and so is less structured by socio-demographic characteristics than reading test scores. However, both home learning environment and involvement in out-of-school activities were significantly related to selective attention test scores.

At age 13, scores in the verbal fluency test declined with increased exposure to persistent poverty. A significant proportion of this effect was explained by differences in home learning environment (with the number of books in the home, use of the local library and reading for pleasure emerging as particularly strong influences), and in teacher and school factors (DEIS status and quality of interaction with teachers). In contrast to the pattern for reading score at age 9, family relationships and out-of-school activities did not mediate the effect of persistent poverty on adolescent cognitive scores.

4.3 Persistent poverty and attitudes to school

At age nine, children were asked whether they ‘always’, ‘sometimes’ or ‘never’ liked school. Descriptive analyses indicated that children living in persistent poverty were more likely to ‘never’ like school but, taking account of other factors, attitudes to school did not vary systematically by exposure to poverty. However, teacher and school factors, home learning environment, out-of-school activities and family relationships were all significantly related to attitudes to school. At age 13, in contrast, more negative attitudes to school were found to be related to persistent poverty. Teacher and school factors played the strongest mediating role while home learning environment, out-of-school activities and neighbourhood factors all played a part in mediating the impact of poverty. Those with more exposure to persistent poverty also tended to be more likely to find their school subjects difficult. Home learning factors played the strongest mediating role for subject difficulty, with some role for school factors, out-of-school activities and neighbourhood characteristics.

At age 13, young people were asked about how far they expected to stay on in full-time education. Those with exposure to persistent poverty had significantly lower expectations. School and teacher factors along with home learning environment had the strongest mediating roles, with out-of-school activities also playing a modest part.

4.4 Limitations

The structural equation modelling undertaken aims to explore the linking mechanisms between persistence of poverty and educational outcomes; however, it does not provide causal evidence. The analyses do not control for earlier ability scores: as we are measuring the exposure to poverty from 9 months of age, there is no clear prior measure to draw on. Future analysis could usefully undertake growth curve analysis of trajectories of cognitive development among children with different exposures to poverty (see Jerrim and Carvajal, 2025). Future research could also attempt to distinguish between the timing and duration of exposure to poverty.

Furthermore, the relationships outlined here should be seen as the ‘raw’ association of poverty persistence and educational outcomes. The structural equation models do not attempt to control for the effect of parental education and class. These are strong predictors of poverty

exposure and (some of) their influence on educational outcomes will be captured in the measure of poverty persistence. The mechanisms linking parental social class and education to children's educational outcomes are likely to overlap closely with the mechanisms tested for poverty, and future research could aim to disentangle which mechanisms are more influential for alternative measures of socio-economic status.

There are also a number of limitations to the measure of poverty. The measure of poverty persistence is based on the household situation at the time of the interviews. It is likely that some families will have experienced changes between interviews that are not captured by the data, thus missing more transient periods of poverty. Secondly, due to the absence of material deprivation indicators at age 13, it was not possible to implement the measure of multi-dimensional poverty used in previous research (Maître et al., 2021).

4.5 Implications for policy development

The study findings point to a clear relationship between experiencing persistent poverty and poorer educational outcomes in terms of vocabulary development and, at age 13, educational expectations and attitudes to school and school subjects. The results show that the strongest mechanisms underlying the effect of persistent poverty relate to the home learning environment, out-of-school activities at primary level, and school and teacher factors at post-primary level.

It appears that persistent poverty impacts on the home learning environment with less access to resources such as books in the home and educational visits with family.²⁰ Similarly, persistent poverty results in lower access to out-of-school activities, such as reading for pleasure and the educational, cultural and sports activities that enhance in-school learning among this group of children and young people. Previous GUI-based research shows that the social gradient in cultural activities emerges early and has a long-lasting impact (Smyth, 2016a), highlighting the importance of early-years provision in offering exposure to a range of cultural activities for children from all social backgrounds. Schools can and do play an important role in providing direct access to school libraries, extra-curricular activities and, at primary level, promoting parent-child reading. There is existing

²⁰ The structural equation models show that overall levels of the home learning environment are lower in persistently poor homes, rather than showing the patterns for particular dimensions of HLE.

evidence of some success in involving parents in reading with their children, with indications of a narrowing social gradient in parent–child reading around the time of starting primary school in Ireland compared with Scotland (Smyth and Duta, 2023).

DEIS schools appear to have somewhat narrowed the social gap in the provision of extra-curricular cultural activities, with offering such activities found to have a positive spillover effect on cultural engagement outside school (Smyth, 2020). A pilot programme in DEIS schools in Dublin’s North East Inner City, City Connects, works with primary school teachers to identify the interests of children and link them to local provision, a model that may be worth exploring more generally.²¹ Participation in team sports at age 13 is also linked to educational expectations and positive attitudes to school. Although schools can play a role in providing access to cultural and other activities, many such activities require payment, constraining access for children from poor families. Unfortunately this information is not available for Cohort ’08 but data on Cohort ’98 at age 13 indicate that four-fifths were required to pay for drama, music or dance lessons and four in ten had to pay for involvement in organised sports. The Creative Youth Plan 2023–27 places an emphasis on promoting equity of access to creative activities (Government of Ireland, 2023).²² Sport Ireland’s (2023) Statement of Strategy 2023–2027 similarly emphasises the importance of diversity and inclusion. Our study findings point to the need for increased provision of subsidised activities at the community level to enhance equity of access to cultural (and sports) participation among children and young people.

School and teacher factors emerged as important mediating mechanisms for 13-year-olds. In keeping with previous international and Irish research (Crosnoe et al., 2004; Dempsey et al., 2024; Smyth, 2016b), school climate – that is, the quality of teacher–student relationships – is strongly associated with a range of educational outcomes. Positive teacher–student interaction – that is, the frequency with which students receive praise from their teachers – is significantly related to higher verbal fluency, more positive attitudes to school,

²¹ While a formal evaluation of City Connects in Dublin has not yet been published, it is based on a model developed at Boston College which showed a clear impact on student outcomes (Walsh and Higgins, 2021).

²² It should be noted that the interim report highlights the fact that much of the activity to date on the equity strand has focused on schools rather than community-based organisations (Government of Ireland, 2025).

lower perceived subject difficulty and higher educational expectations. Negative teacher–student interaction (being given out to for misbehaviour or schoolwork) is related to young people having more negative attitudes to school, greater subject difficulty and lower educational expectations. Measures to promote a more positive school climate, with mutual respect between teachers and students, more inclusive teaching practices and involvement of students in school decision-making, are therefore likely to pay dividends in enhancing educational outcomes and mitigating the negative impact of persistent poverty on these outcomes. Promoting an understanding of disadvantage and diversity in initial and continuing teacher education could also help foster more inclusive and equitable schools and classrooms. The relationship between poverty and lower educational expectations, and the role of school factors in helping explain this pattern, is concerning, given the potential of lower educational qualifications to lead to poorer life chances in the longer term.

The DEIS programme represents the main policy response in Ireland to counter the impact of poverty and other forms of socio-economic disadvantage on educational outcomes (DEY, 2026). At ages 9 and 13, children living in persistent poverty are over-represented in DEIS schools, particularly urban DEIS primary schools. However, almost two-thirds of those experiencing multiple spells of poverty²³ are attending non-DEIS schools, so until recently have received no specific supports by virtue of their disadvantage. The new DEIS Strategy to 2035 (DEY, 2026) includes a commitment to ‘address educational disadvantage in all schools’ (p. 16), with a pilot programme recently introduced to widen access to the home-school liaison scheme for a selected number of non-DEIS schools.

The DEIS programme is generally regarded positively by stakeholders in Ireland and elsewhere (see, for example, OECD, 2024). Nonetheless, existing supports do not appear sufficient to close the inequality gap. Findings from this study indicate lower reading test scores at age 9, and at age 13 lower verbal fluency scores, more negative attitudes to school and lower educational expectations in DEIS than in non-DEIS schools (see Tables A7 and A8). Even taking account of the level of persistent poverty, vocabulary test scores in Urban Band 1 schools are significantly lower than in other schools. Similarly, verbal fluency scores are lower in DEIS schools, even controlling for poverty,

²³ Three or more spells by age 9, four or more spells by age 13.

disability and gender. Perceptions of subject ease are also lower in DEIS schools even with a full set of controls. Educational expectations remain significantly lower in DEIS schools, even taking account of persistent poverty, family relationships, home learning environment, out-of-school activities, and other teacher and school factors. The new DEIS strategy (DEY, 2026) identifies ‘DEIS Plus’ schools, with the highest concentration of disadvantage, for additional support. For DEIS schools overall, the strategy places stronger emphasis on inter-agency coordination, wellbeing supports and student voice, among other features, aspects that are likely to contribute to a more holistic set of supports for children and young people. Nonetheless, it is important that the scale of additional resources and supports is sufficient to help bridge the gap in outcomes between students living in persistent poverty and their peers. A new monitoring and evaluation framework should provide more information on changes over time in a range of student outcomes in DEIS and non-DEIS schools as a basis for further refining and developing the model.

School-based measures to mitigate the impact of poverty on educational outcomes must be located within a broader set of income and other supports to ensure a reduction in the level of poverty and its negative consequences. Deprivation levels among children and young people are higher than among the adult population and have started to increase with the recent cost-of-living crisis (Roantree and Doorley, 2023; CSO, 2025). There has been some progress in reducing educational costs, including free books and breakfast provision, but there are still significant costs attached to schooling, including uniforms, sports equipment, digital devices and Transition Year fees. The introduction of a second-tier child benefit to cover all households with children based on means and family size would reduce child poverty by a quarter (Roantree and Doorley, 2023). Poverty has significant consequences for family relationships, parental mental health, addiction and the likelihood of living in poor or insecure housing. School-based initiatives to tackle educational disadvantage therefore need to be underpinned by broader supports for vulnerable families at local level, including mental health and other supports for parents, and integrated approaches to meeting the needs of local communities, such as through the Social Inclusion and Community Activity Programme.

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Appendix

Table A1 Experiencing great difficulty making ends meet by income quintile

Survey wave	% experiencing great difficulty making ends meet		
	Lowest income quintile	Quintiles 2–5	All
W1, 9 months	13.3	2.4	4.9
W2, 3 years	23.2	5.3	9.3
W3, 5 years	24.8	7.9	11.3
W5, 9 years	9.7	2.6	4.4
W6, 13 years	8.2	1.5	3.0

Note: Panel sample of those included in all waves.

Table A2 OLS and logit models of educational outcomes at age 9

	Reading score		Selective attention		Never like school	
	Model 1	Model 2	Model 1	Model 2	Model 1	Model 2
	Coeff.	Coeff.	Coeff.	Coeff.	OR	OR
Never poor (ref.)					1	1
Poor once	-0.256***	-0.159***	0.200	0.489	0.992	0.975
Poor twice	-0.362***	-0.179***	-1.381**	-0.798	1.034	0.929
Poor 3 times	-0.558***	-0.349***	-1.179	-0.419	0.899	0.833
Poor 4 times	-0.743***	-0.413***	-0.598	0.355	0.916	0.819
Male (ref.)					1	1
Female	0.052	-0.050	2.192***	1.915***	0.491***	0.659***
No disability (ref.)					1	1
Disability	-0.090*	-0.075*	-0.966**	-0.765*	1.083	1.012
Conflict with PCG (higher = low conflict)		0.047**		-0.175		0.891**
PCG stress scores		-0.013		0.168		0.997
Mother's parenting style (higher = less harsh)		0.034*		0.316*		0.963
Reading for pleasure		0.206***		0.401**		0.832***
Team sport		0.040		1.062***		0.958
Indiv. sport		0.001		0.452		0.877
Drama		0.083*		-0.376		0.932
Arts		0.078		0.894		0.952
Music		0.084**		0.658*		0.891
Books in home		0.139***		0.269		1.05
Reading to child at age 5		0.040**		-0.084		0.954
Listening to child read		-0.136***		-0.249		0.989
Educational visits		-0.024		0.059		0.986
Concert		0.051		0.261		1.026
Library		0.075**		0.465		0.965
Neighbourhood disorder		0.006		0.109		1.023
Social capital		-0.014		-0.009		1.031
Rural		0.034		0.728*		0.968
Teacher conflict						
Lowest (ref.)						1
2		0.050		1.062*		0.713**
3		-0.089*		0.259		0.682***
4		-0.014		0.052		0.637***
Highest		-0.028		0.814		0.624***
Teacher closeness						
Lowest (ref.)						1
2		0.115*		0.726		0.837
3		0.183***		0.702		0.738*
4		0.128**		0.785		0.98
Highest		0.190***		0.475		0.786
Teacher praise						
Never (ref.)						1
Sometimes		0.226***		-0.382		0.700*
Always		0.008		-0.696		0.323***
Teacher negative interaction						

	Reading score		Selective attention		Never like school	
	Model 1	Model 2	Model 1	Model 2	Model 1	Model 2
Always (ref.)						1
Sometimes		0.193*		0.984		0.388**
Never		0.102		0.788		0.245***
Teacher talk						
Never (ref.)						1
Sometimes		0.038		-0.215		1.083
Always		-0.146**		0.419		0.859
Non-DEIS (ref.)						1
DEIS		-0.011		0.387		1.039
Constant	0.433***	-0.651***	31.329***	26.878***		
Observations	6,781	6,781	6,782	6,782	6,912	6,912
Adjusted R-squared	0.063	0.231	0.02	0.039	n/a	n/a
Pseudo R-squared					0.022	0.081

Source: GUI Cohort '08, Wave 5.

Notes: OR = odds ratios; values less than 1 indicate the outcome is less likely for the group in question and values greater than 1 indicate it is more likely.

Coeff. = coefficients from OLS regressions.

PCG = primary caregiver

Dummies for 'DEIS missing' and 'teacher information missing' were included in the model but are not reported in the table.

*** p<.001, ** p<.01, * p<.05.

Table A3 Shapley decomposition of models of outcomes at age 9

Factor	Reading score		Selective attention score		Never like school	
	Shapley value	%	Shapley value	%	Shapley value	%
Group 1	0.029	12.6	0.001	2.9	0.001	0.9
Group 2	0.002	0.9	0.014	36.3	0.011	14.5
Group 3	0.008	3.5	0.002	4.9	0.005	6.1
Group 4	0.083	35.7	0.008	21.2	0.008	11.0
Group 5	0.073	31.4	0.006	14.0	0.003	3.3
Group 6	0.002	0.7	0.001	1.9	0.000	0.2
Group 7	0.036	15.3	0.008	18.9	0.049	64.0
TOTAL	0.234	100.0	0.040	100.0	0.077	100.0

Group 1	Number of waves poor
Group 2	Child gender, child disability
Group 3	Parent–child relationship: Parent conflict score, parenting stress, parenting style
Group 4	Out-of-school activities: reading for pleasure, team sport, individual sport, drama, arts, music
Group 5	Home learning environment: books in home, reading to child, listening to child read, educational visits, attended concert, visited library
Group 6	Neighbourhood: disorder scale, social capital scale, urban
Group 7	School factors: closeness to teacher, conflict with teacher, talk with teacher, negative interactions with teacher, praise from teacher, school DEIS status

Note: The Shapley decomposition is of the adjusted R^2 for the reading score and selective attention models. In the case of the ‘Never like school’ model it is a decomposition of the pseudo R^2 . The Shapley decomposition does not incorporate weights so the R^2 values are from an unweighted model. Differences between totals and sum of the cells are due to rounding.

Table A4 Regression analysis of verbal fluency and perceived subject ease at age 13

	Verbal fluency		Subject ease	
	Model 1	Model 2	Model 1	Model 2
	Coefficient	Coefficient	Coefficient	Coefficient
Never poor (ref.)				
Poor once	-0.343	-0.095	0.118	-0.023
Poor twice	-1.182***	-0.773*	-0.055	0.106
Poor 3 times	-1.85***	-1.270**	-0.602***	-0.354**
Poor 4 times	-2.405***	-1.689**	-0.447***	-0.148
Poor 5 times	-2.815***	-1.953*	-0.592*	-0.350
Female (ref.)				
Male	0.190	-0.343	-0.019	-0.209**
No disability (ref.)				
Disability	-0.101	-0.009	-0.495***	-0.365***
Conflict with PCG (reverse)		0.369***		0.086*
PCG's stress score		0.022		0.033
Mother's parenting style		-0.253*		-0.003
Reading for pleasure		0.473***		0.212***
Team sport		-0.017		0.065*
Cultural activity		0.453***		0.079*
Books in home		0.401***		0.096**
Reading to child		0.249*		0.045
Listening to child read		-0.227*		-0.041
Educational visits		0.107		-0.033
Concert		-0.174		-0.018
Library		0.528**		0.005
PCG educ. involv.		-0.072		-0.004
Neighbourhood disorder		0.105		0.030
Social capital		-0.125		0.000
Rural		0.178		0.056
Teacher positive Q1 (ref.)				
Teacher positive Q2		0.183		0.360***
Teacher positive Q3		0.715**		0.501***
Teacher positive Q4 (top)		0.921***		0.709***
Teacher negative Q1 (ref.)				
Teacher negative Q2		-0.120		-0.127
Teacher negative Q3		-0.417		-0.379***
Teacher negative Q4 (top)		-0.275		-0.971
Non-DEIS at age 9 (ref.)				
DEIS at age 9		0.046		0.039
Non-DEIS at age 13 (ref.)				
DEIS at age 13		-0.412		-0.140*
Constant	21.448***	21.552***	8.757***	8.580***
Observations	5,341	5,341	5,402***	5,402
Adjusted R-squared	0.024	0.091	0.035	0.119

Source: GUI Cohort '08, Wave 6.

Note: Dummies for 'DEIS missing' and 'teacher information missing' were included in the model but are not reported in the table.

*** p<.001, ** p<.01, * p<.05.

Table A5 Logit models of educational expectations and school attitudes at age 13

	Educational expectations		Never like school	
	Model 1	Model 2	Model 1	Model 2
	OR	OR	OR	OR
Never poor (ref.)	1	1	1	1
Poor once	0.609***	0.658***	1.171	1.103
Poor twice	0.585***	0.717*	1.573*	1.358
Poor 3 times	0.429***	0.555**	1.682*	1.164
Poor 4 times	0.474***	0.66	1.410	0.917
Poor 5 times	0.465*	0.649	1.117	0.975
Male (ref.)	1	1	1	1
Female	2.004***	1.854***	0.968	1.283
No disability (ref.)	1	1	1	1
Disability	0.543***	0.633***	2.134***	1.649***
Conflict with PCG		1.245***		0.869*
PCG's stress score		0.877*		1.034
Mother's parenting style		1.034		0.986
Reading for pleasure		1.290***		0.679***
Team sport		1.138**		0.804***
Cultural activity		0.949		0.871
Books in home		1.118*		1.027
Reading to child		1.001		1.068
Listening to child read		0.948		0.895
Educational visits		1.061		1.101
Concert		1.382**		0.849
Library		1.049		0.987
PCG educ. involv.		0.983		1.03
Neighbourhood disorder		1.006		0.973
Social capital		0.933		0.902
Rural		1.221		1.196
Teacher positive Q1 (ref.)		1		1
Teacher positive Q2		1.488**		0.468***
Teacher positive Q3		1.823***		0.362***
Teacher positive Q4 (top)		1.827***		0.341***
Teacher negative Q1 (ref.)		1		1
Teacher negative Q2		0.692**		1.746**
Teacher negative Q3		0.524***		1.978***
Teacher negative Q4 (top)		0.425***		4.390***
Non-DEIS age 9 (ref.)		1		1
DEIS age 9		1.220		0.817
Non-DEIS age 13 (ref.)		1		1
DEIS age 13		0.644**		0.897
Observations	5,055	5,055	5,386	5,386
Pseudo R-squared	0.054	0.125	0.028	0.144

Source: GUI Cohort '08, Wave 6.

Note: *** p<.001, ** p<.01, * p<.05.

Table A6 Shapley decomposition of models of outcomes at age 13

Factor	Verbal fluency		Subject ease/difficulty		Educational expectations		Never like school	
	Shapley value	%	Shapley value	%	Shapley value	%	Shapley value	%
Group 1	0.010	16.7	0.008	6.1	0.010	10.6	0.004	3.0
Group 2	0.001	1.4	0.015	11.7	0.002	18.2	0.008	6.4
Group 3	0.002	3.4	0.008	6.6	0.007	7.5	0.015	11.5
Group 4	0.022	37.2	0.027	21.0	0.018	18.0	0.028	22.2
Group 5	0.014	22.9	0.007	5.8	0.010	10.5	0.003	2.5
Group 6	0.001	2.3	0.002	1.7	0.005	4.7	0.003	2.5
Group 7	0.009	16.1	0.060	47.0	0.030	30.6	0.066	52.1
TOTAL	0.059	100.0	0.127	100.0	0.098	100.0	0.126	100.0

Group 1	Number of waves poor
Group 2	Child gender, child disability
Group 3	Parent–child relationship: Parent conflict score, parenting stress, parenting style
Group 4	Out-of-school activities: reading for pleasure, team sport, cultural activities
Group 5	Home learning environment: books in home, reading to child, listening to child read, educational visits, attended concert, visited library, parent educational involvement
Group 6	Neighbourhood: disorder scale, social capital scale, urban
Group 7	School factors: positive interactions with teacher, negative interactions with teacher, DEIS status at age 9, DEIS status at age 13

Note: In the case of verbal fluency and subject ease/difficulty, the Shapley decomposition is of the adjusted R^2 . In the case of never like school and educational expectations it is of the pseudo R^2 . The Shapley decomposition does not incorporate weights, therefore the adjusted R^2 /pseudo R^2 is derived from an unweighted model. Differences between totals and sum of the cells are due to rounding.

Table A7 Regression models of verbal reasoning test score at age 9 by DEIS status of the school (reference: non-DEIS schools)

	Urban Band 1	Urban Band 2	Rural DEIS
Reading test scores:			
Raw	-0.386***	-0.122±	-0.138*
Controlling for poverty, gender and disability	-0.208**	-0.015	-0.018

Note: *** p<.001, ** p<.01, * p<.05.

Table A8 Regression models of selected outcomes at age 13 by DEIS status of the school (reference: non-DEIS schools)

	DEIS
Verbal fluency test scores:	
Raw	-1.119***
Controlling for poverty, gender and disability	-0.689*
Attitude to school (ordered logit):	
Raw	-0.248*
Controlling for poverty, gender and disability	-0.137
Educational expectations (ordered logit):	
Raw	-0.754***
Controlling for poverty, gender and disability	-0.601***
Subject ease:	
Raw	-0.242*
Controlling for poverty, gender and disability	-0.123

Note: *** p<.001, ** p<.01, * p<.05.



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